THE VETERINARY RECORD

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Redwater.

The discussion upon "Redwater" by the Western Counties V.M.A. is of very special interest. It concerns an important disease of stock, the pathology of which has been quite misunderstood until recently, and still presents many points for further experiment and observation. We now know that English redwater is an inoculable piroplasmosis, and that it is disseminated by ticks; but though much work has been done in studying the life-history of the tick, there is room for further enquiry—especially in the direction of comparing the life periods under natural conditions with those observed in the laboratory. And we have still something to learn regarding treatment of the disease. The effects of aperients and tonics have long been recognised, but such measures as transfusion and hypodermic injection, which are naturally suggested by our present pathological knowledge has as yet received little if any trial in England. Then there is the problem of prevention. Several methods are known, but none are free from practical difficulties, and one—inoculation—really means a permanent acceptance of the disease in a milder form. Probably Mr. Stockman is right in expecting to obtain the best results from a combination of two methods, viz., prosecuting a vigorous warfare against ticks, and at the same time, whenever possible, stocking infected land with sheep. This, the most hopeful method, would often be very difficult in practice, and would probably require many modifications of detail in different districts.

The whole question, like many others in veterinary medicine, demands the co-operation of the scientist and the practical man—not only in the elucidation of points which are still obscure, but also in the treatment and prevention of the disease.

There are many other diseases which are never likely to be scheduled, but which cause serious losses amongst farm stock. In this connection the policy of the Board of Agriculture seems changing. It is a new thing for the Chief Veterinary Officer of the Board to come unofficially before a meeting of practising clinicians, to offer them his own knowledge, gained largely in the laboratory, and to ask, in return, for information upon specified points regarding which their very different experience may usefully supplement his own. It is certainly also a very welcome thing, and if practitioners generally meet such efforts in the same manner as the Western Counties' members, the result will be a closer relationship between the Board and the profession, to the benefit of science and of agriculture alike.

VESICAL CALCULUS IN A MULE.

Subject.—An aged grey castrated transport mule.

History.—Had been treated medicinally for the past three months or more by the Mule Corps Salutri, for retention of urine, with no success. The symptoms were first noticed in March, 1908, the urine being quite normal, but passed in drops. The diet included linseed tea. It was admitted by me on October 14th, having had an attack of colic 15 days before.

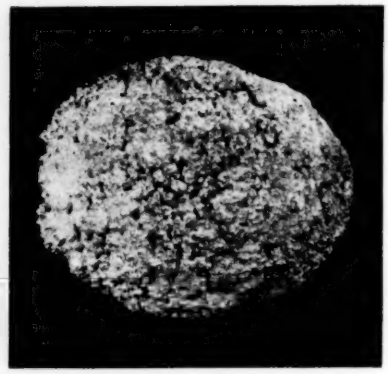
Symptoms.—The mule was in a very debilitated condition, urine was passed in drops occasionally, the act of urination apparently being carried out with great pain and difficulty. The urine was cloudy and blood-tinged. Temperature, pulse, and respirations normal. The appetite was very poor, although these mules usually eat the bhoosa supplied them readily.

Diagnosis.—A catheter was passed round the ischial arch with manual assistance, per rectum, but it would not pass into the bladder. A calculus, about the size of a hen's egg, was felt obstructing the cervical portion of the bladder, the end of the catheter being against it. The calculus was situated about ¾ of a hand's length from the anus. On manual pressure from the urethral side and on the bladder blood-tinged urine was passed in drops.

Treatment.—An operation was delayed for a day or so in an endeavour to procure either lithotomy forceps or a lithotrite. In the meantime the mule was placed on a laxative diet, and Pulv. resin. ʒss. administered twice daily. This was replaced subsequently by Acid Hydrochlor. dil. ʒii. in the drinking water thrice daily. No lithotomy forceps being immediately obtainable, on October 17th the operation of lithotomy was carried out, the animal having been noticed to pass urine, in the meantime, in drops only.

Operation.—The mule was backraked, cast with sidelines, and chloroform administered, ʒvi. proving necessary for the operation. After the usual aseptic precautions the animal was placed on its back, and the catheter passed. It proving very difficult to pass it round the ischial arch in this position, he was placed on his left side, the catheter was then passed easily in a forward direction, as far as a finger's length from the anus. There it encountered the calculus, which had apparently started to come down the urethra. An incision was made in the skin in the perineal region and the catheter cut down upon, with very little hæmorrhage, the catheter being then withdrawn away from the wound, and a metal probe passed into the urethra. The calculus being then only about three

nches from the operation wound, was removed with a pair of Arnold's bullet forceps, the soft outer coat crumbling away in the first endeavour to grasp it. A flow of cloudy urine followed its extraction. The stone (shown in the photo) was egg shaped, very



rough, hard in consistence, and apparently composed of calcium oxalate. On longitudinal section, no nucleus was found in the centre of it, the calculus being quite hard and stony throughout. It was about two ounces in weight, two inches long, one inch broad, and about one and a quarter inches high in the middle. The bladder was then washed out with a saturated solution of boric acid by means of a metal canula, the solution coming out quite clear. The skin incision being only one and a half inches in length, three stitches only were required, silk being used, and a similar method to Lembert's bowel sutures being employed. The canula was left in between the two upper sutures to aid in washing out the bladder and urethra.

After Treatment consisted of a bran and bhoosa diet, daily washing out the bladder with saturated solution of Boric acid; the perineal wound being dressed with 2½ per cent. Carbolic acid solution and dry dressing; Ung. zinci being rubbed on the surrounding parts, and the canula cleaned daily. The canula was held in position by tape fastened round the body.

Oct. 18.—Temp. 101, pulse, respirations, and urine normal; very little swelling of wound, but some blood-tinged discharge down the hind legs. Food consumed greedily. Seen to pass about three pints of urine through the canula during the day.

Oct. 19.—Temp. 100·2; feeding well, urine normal.

Oct. 20.—Temp 100·2; Ferri sulph. ʒss. given thrice daily. Wound healed by first intention, so canula removed.

Oct. 21.—Temp. 101; urine normal and passsd through penis; wound healing well.

Oct. 22.—Temp. 100; bottom stitch loosening.

Oct. 23.—Temp. 104; two lower stitches broken.

Oct. 24.—Temp, 100; slight discharge of pus in the urine. From this date the mule passed out of my treatment owing to my being transferred to another station, but I saw it subsequently on two occasions.

Nov. 5.—Wound practically healed; slight discharge from penis with urine, but passing urine normally.

Nov. 12.—I saw the mule again; the wound was then barely visible; the animal had put on a lot of flesh and was looking quite fit. It was reurned to duty the next day.

H. C. Stewart, Lieut. A.V.C.

Nowshera, India, N.W.F.

SIMPLE OPERATION FOR SHOULDER TUMOURS.

The operation described in last week's *Veterinary Record* by Mr. F. H. Gibbings, F.R.C.V.S., leads me to detail a simple method, learnt from my father, which I have practised successfully for many years in the removal of tumours from the point of the shoulder or base of the neck. It consists in plunging a pointed red hot iron into the heart of the tumour from below upwards, and then applying a blistering ointment of biniodide of mercury to the surface of the swelling. After removing the hair, I inject four grains of cocaine at the point selected for insertion of the iron, wait for three minutes, then pierce the tumour with a cautery, shaped like a small pointed poker; almost invariably pus escapes on withdrawing the iron. A hole is made large enough to admit a small finger and the tumour blistered. Two days later the wound is plugged with biniodide ointment on tow which is left in position for twenty-four hours. After that ordinary antiseptic treatment is adopted.

When the tumour is of great size I make several openings with the iron. No casting or chloroform is required, hæmorrhage is entirely avoided, and I cannot remember a case where the result has not been absolutely satisfactory, no trace of the tumour being left.

Robert Barron, M.R.C.V.S.

Blandford.

CLINICAL CASES.

By J. H. Parker, Mill House, Faringdon.

Vomition in the Horse.

Subject.—A bay carriage gelding, 17 years old, property of Sir Alex Henderson, Bart., Buscot Park. About three years ago the horse was attacked with a fit of vomition which lasted about an hour, when he recovered and seemed as well as ever. He had four attacks the first year. During the attacks he would arch his neck and bring up—mostly through the nostrils—a lot of frothy mucus. His pulse and temperature would remain normal, but there was diffuse sweating in the region of the neck only. The attacks became more frequent, and on November 13 last he was attacked with double pneumonia from which he died on the 14th.

A post-mortem examination showed the cause of the vomition to be dilatation of the œsophagus, close to the stomach. The wall of the œsophagus on one

side was dilated, and attenuated to the thickness of a sixpence. The dilation would hold about a pint. There was an opening passing from the end of the œsophagus into the stomach large enough to hold one of my fingers, so that the œsophagus had lost its valve-like action, and this would allow the liquid food to flow back into the œsophagus from the stomach.

This horse had been attended by London veterinary surgeons during "the season," but none of us knew the cause of the illness until after death.

A Calculus.

Subject.—An aged grey cart gelding. Had not passed any fæces for a day previous to my seeing him. He had an anxious expression on the face and would occasionally walk round his box, but not in much pain. He went on like this for three days, and died. Not being able to make a post-mortem myself, asked the knacker to report, and he sent me a calculus, which from his description I should think came from the floating colon. It is of a saline nature, semi-spherical in shape, weighs six ounces, and measures five inches across the flat surface, surfaces undulated, colour a dull aluminium. On the flat surface can be seen a piece of twisted copper wire, which evidently acted as a nucleus. The bowel was perforated where the calculus was found.

Pharyngeal Abscess.

Subject.—A shorthorn cow.

Symptoms.—Nose poked out, roaring, and flapping of lips at angle of mouth with each expiration; salivation, emaciation. Fixing a Revelation mouth gag, a soft fluctuating swelling could be found just behind the soft palate. This I opened with a Farmer Miles' castrating knife (hooked) and let out about half-pint of fœtid inspissated pus. The cow made a good recovery in a few days.

WESTERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

The 60th general meeting was held at the Royal Clarence Hotel, Exeter, on Thursday, the 19th November, when the President, Mr. W. Graham Gillam, Minehead, occupied the chair. Others present included Messrs. Stewart Stockman, Chief Veterinary Officer, Board of Agriculture; Wm. Ascott, Bideford; T. E. Baker, Crewkerne; W. H. Bloye and P. G. Bond, Plymouth; E. W. Bovett, Bridgwater; A. J. Down, Sampford Peverell; John Dunstan, Liskeard; E. Dunstan, Okehampton; G. H. Gibbings, Tavistock; T. Olver, Truro; C. C. Parsons, Launceston; Wm. Penhale, Holsworthy; W. P. Stableforth, Colyton; Wm. Roach, Exeter; E. J. Thorburn, Tiverton; and H. E. Whitemore, Langport.

The minutes of the last meeting, and of a special meeting held at Exeter on 24th August, were read and confirmed.

Obituary.

The President said: Before commencing the ordinary business of this meeting I should like to refer to the loss which the profession in general, and this Association in particular has suffered since our last meeting, by the death of Mr. Wm. Penhale, of Barnstaple. In conjunction with the Hon. Secretary, we took upon ourselves the duty of sending a floral cross, and also of conveying to Mrs. Penhale a vote of condolence and sympathy, to which I have received the following reply:—

Castle Street, Barnstaple,
October 8th, 1908.

Dear Mr. Gillam,

May I ask you to convey to the members of the Western Counties Veterinary Medical Association the heartfelt thanks of myself and my family for the most kind and sympathetic letter you were good enough to send us on their behalf, and also for the beautiful wreath they so kindly sent.—Yours very sincerely,

Alice Penhale.

I am sure you will all agree with this action, but I think it will be only fitting that we should, at this our first meeting after his death, pass a formal vote, so that the same may be duly recorded in the minutes of the Association. No one will miss the late Mr. Penhale more than we, as an Association, shall. Personally, I can testify to his sterling good qualities, as I was for some time an assistant with him; his loss is not only a personal one but will be felt by the whole of the profession.

Mr. Bloye said: I rise with considerable feeling to second this resolution. Mr. Penhale was one of the founders, and I may say practically the "Father" of this Association; he always took the liveliest interest in its debates, and was a frequent contributor of subjects for discussion. He was of the pleasantest disposition and was particularly kind to the younger members; his loss is most keenly felt throughout the West of England, not only by his brother practitioners, but also by those outside the profession as has been abundantly testified in the Press.

The vote was then carried in the usual way, by all present standing.

Contagious Diseases (Animals) Act.—Fees.

Arising out of the minutes Mr. Gibbings asked to have the scale of fees finally agreed on with the Devon County Council read. It is as follows:—

For visiting any place under ten miles, 10s. 6d., and 1s. a mile, by road, over five miles.

For post-mortem when necessary, 5s. No extra fee for microscopical examination.

For visiting any place over ten miles, 21s., and 1s. a mile, by road, over five miles. (This to include post-mortem and microscopical examination when necessary.)

Apologies for non-attendance were read from Sir John M'Fadyean, Professors Hobday and Penberthy, Messrs. G. H. Elder, R. E. L. Penhale, G. Parker, Short, and J. Toms.

REDWATER IN ENGLAND AND ITS CARRIERS

By Stewart Stockman, M.R.C.V.S., Chief Veterinary Officer, Board of Agriculture, London.

Mr. President and Gentlemen,—This paper has already been published; unfortunately there was no time to discuss it at Brighton, and I was extremely pleased when I was asked to come down here—in the midst of a redwater district—to bring the subject before this meeting.

After Smith and Kilborne in 1888 had demonstrated the presence of hæmatozoa (the pyrosoma bigeminum) in the red blood corpuscles of cattle affected with "Texas Fever," which is a disease characterised by destruction of the red cells and frequently by the presence of a visible amount of the colouring matter of these cells in

the urine, similar observations were made in all quarters of the globe in connection with the disease which in England we call redwater. Five years later in 1893, the above authors showed that "Texas Fever" could be produced in susceptible cattle by inoculating them with the blood of animals suffering from or which had recovered from an attack, and that the disease could be carried indirectly by ticks. These later observations have also been confirmed in various parts of the world, particularly in Australia and South Africa, and on the continent of Europe, and it is now generally accepted that wherever redwater is observed as a disease of cattle, one may expect to find that it is associated with and caused by the presence of piroplasms of the bigeminum type in the red corpuscles.

Curiously enough it was not until quite recently that piroplasms were demonstrated in the red corpuscles of cattle suffering from redwater in the United Kingdom. The late Prof. Nocard found them in the blood of an affected animal in Ireland in . Since then their association with redwater of cattle has been frequently established in many parts of the United Kingdom, and I do not think that anyone will now seriously deny that redwater of cattle, as we meet with it in England, is caused by the presence of piroplasms in the red blood corpuscles. But to completely establish the analogy between British redwater and the kindred disease met with elsewhere and now classed as a piroplasmosis, it is not sufficent to demonstrate the presence of piroplasms in the red corpuscles. One must also show that it can be inoculated to other cattle by means of the blood of affected animals, for every piroplasmosis is not inoculable, and that it can be carried indirectly by ticks. In collaboration with Sir John M'Fadyean I have for the last three years been investigating redwater in Great Britain and its relation to the disease met with in other parts of the world.

A great deal of work has been done in connection with the life-periods of ticks in the field, and their relation to outbreaks of the disease. I do not propose to go fully into this, however, or to describe in detail the methods adopted, as we intend at a later date to publish a full report.

I will take first the inoculability of the English disease as this throws some light, I think, on the failures and successes obtained with ticks. If one were to judge by the experimental results so far published in the United Kingdom, one might be led to the opinion that the analogy between redwater in England and the Texas Fever type of disease breaks down over the inoculation test, and that the former possibly belongs to the type of piroplasmosis (East Coast Fever) which is not inoculable, for, so far as I am aware, all the published results up-to-date have been declared negative. Our results after inoculating the blood of cattle suffering from or recently recovered from English redwater make such a conclusion untenable, for although we have had some absolutely negative and some doubtful reactions, the majority of our results have been positive.

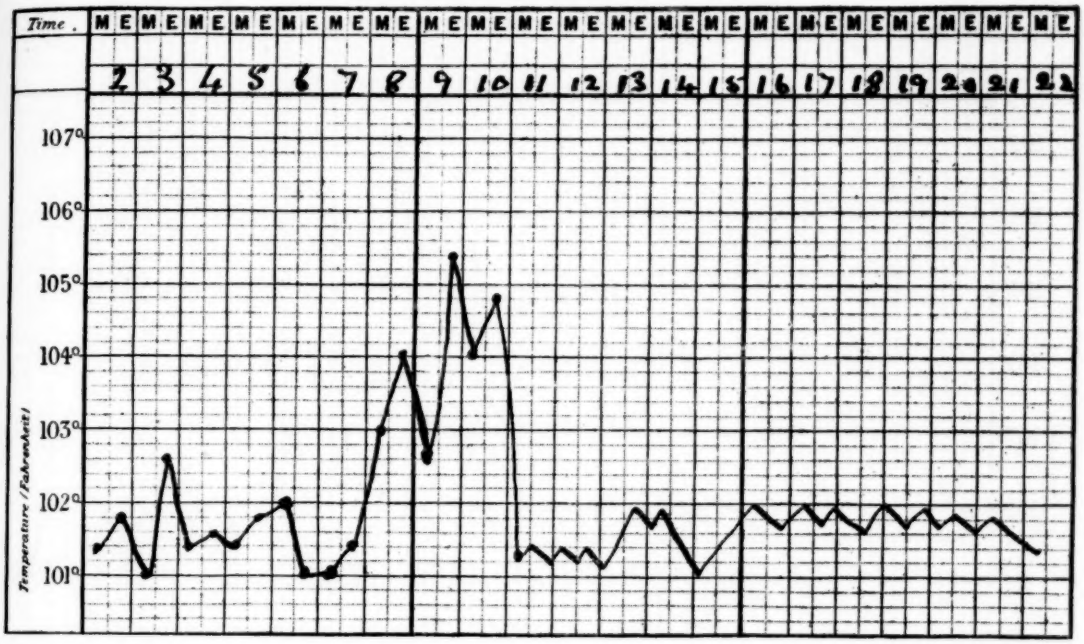
With regard to the reactions described as doubtful, I mean those which within the prescribed incubation period after inoculation showed a distinct febrile reaction, but in the blood of which no piroplasms could be found, the results obtained in Heifer 49 and afterwards with her blood illustrate an indefinite reaction. Heifer 49 was inoculated with 5 c.c. of blood obtained from an acute case in the field, and two days before the withdrawal of the blood used for inoculation piroplasms were numerously present in the red cells. Five days after inoculation the temperature of Heifer 49 rose 2 F., and remained above normal for three weeks, but no piroplasms were ever found in the blood in spite of daily examination. During the febrile reaction blood was withdrawn from Heifer 49 and defibrinated. From 2·5 c.c. of this blood were injected subcutaneously to six heifers. One of these, No. 54, had a temperature reaction commencing on the 7th day and lasting three days; the highest temperature recorded was 104.2 F. No piroplasms were found in the blood. The other five animals showed no reaction whatever.

That the failure on the part of these five heifers to react to the blood of Heifer 49 was not due to any natural or acquired immunity is certain, because about a month later they all reacted more or less definitely to the blood of Cow 2, another case of redwater contracted by natural infection in the field. It is also apparent that the said heifers acquired little or no immunity from the blood of Heifer 49.

The following are the particulars of one of the said heifers, Heifer 3, inoculated subcutaneously with 10 c.c. of defibrinated blood from Cow 2, a month after she (Heifer 3) had failed to react to the blood of Heifer 49. The temperature of Heifer 3 rose to 102 on the sixth day and fell to 101 on the seventh. On the eighth day it rose to 103 morning, 104 evening. Smears taken from the blood on the eighth day showed a small but distinct number of piroplasma bigeminum in the red cells. They were also present on the ninth day, but could not be found after this. The remainder of the reaction can be followed from the attached chart by which it will be seen that the temperature became normal on the eleventh day, and remained so until the 23rd day, when a second rise took place (102-103), which lasted three days. This second rise of temperature after a normal interval is typical of the redwater reaction, and as in the case of the first febrile attack it may or may not be possible to demonstrate piroplasms in the red cells. Two fellow heifers to Heifer 3, numbers 1 and 4, gave a typical febrile reaction, 106 F. within the prescribed incubation period, followed by a second after the usual interval, but no piroplasms could be found in their blood by microscopical examination. If, however, one inoculates a series of animals with the blood of an animal suffering or recovered from redwater, and one finds that they all give a febrile reaction within a prescribed period, followed by a second febrile attack after a more or less constant interval, while in the red blood cells of the majority, as in my experience, one finds piroplasms, one is, I think, justified in concluding that the reaction was due to the virus in the animals in whose blood piroplasms could not be found by microscopical examination, as well as in those in which the blood parasites could be demonstrated. This means that what I have referred to as indefinite reactions to inoculation may be looked upon as positive, and that an animal may be suffering from a slight attack of redwater or piroplasmosis, although no piroplasms can be demonstrated in the blood cells by the ordinary method of examination. This, it will be seen later, has probably some bearing on infection of the ticks themselves, and on the transmission of redwater to cattle by means of ticks.

In order to further illustrate the reaction following upon the inoculation of blood from animals recently recovered from English redwater it will be useful to examine the results obtained on Heifer No. 1b which is one of another series of about 20 animals which have given a positive reaction accompanied by the presence of piroplasms in the red cells, and in addition the reaction in Heifer 1b was associated with marked hæmoglobinuria which I have not found to be usual, but which still further convinces one regarding the nature of the disease inoculated. Heifer 1b was inoculated subcutaneously with 10 c.c. of defibrinated blood from Cow 2. This cow had recovered from an attack of naturally contracted redwater two months previously, but had had a severe relapse one month before her blood was used for Heifer 1b. The temperature of Heifer 1b rose to 105 F. on the fifth day after inoculation. It fluctuated between 105 and 107.2 for four days, and continued to be irregular

REDWATER. HEIFER 3.
10 c.c. of blood from Cow 2 on 1st September.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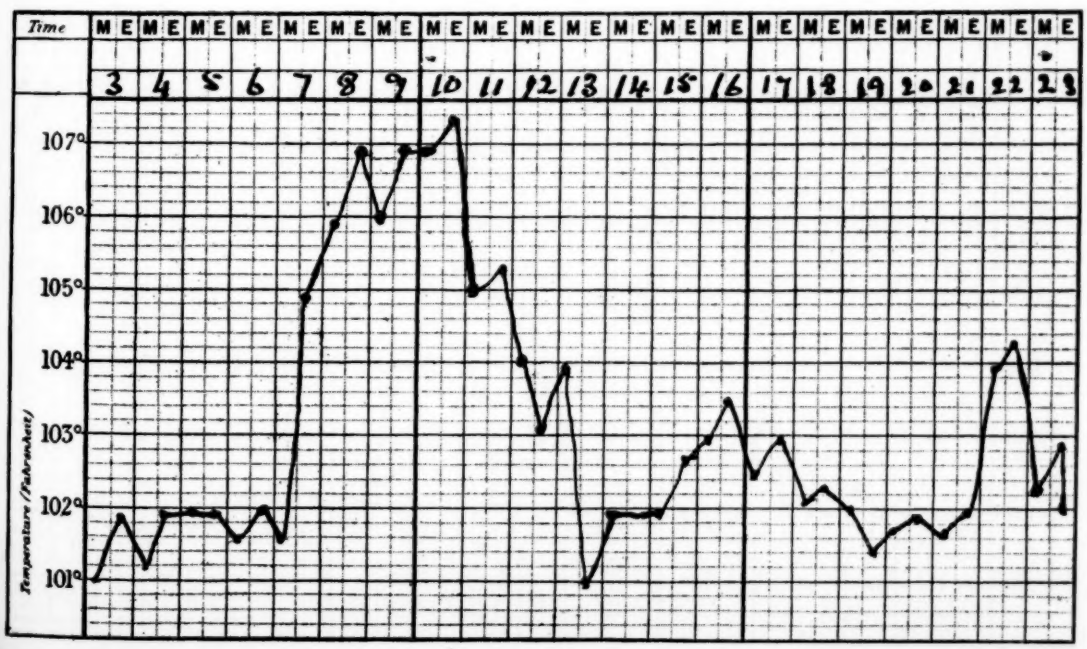
Temperature (Fahrenheit)

REDWATER. HEIFER 1b.
10 c.c. of blood from Cow 2 on 2nd October.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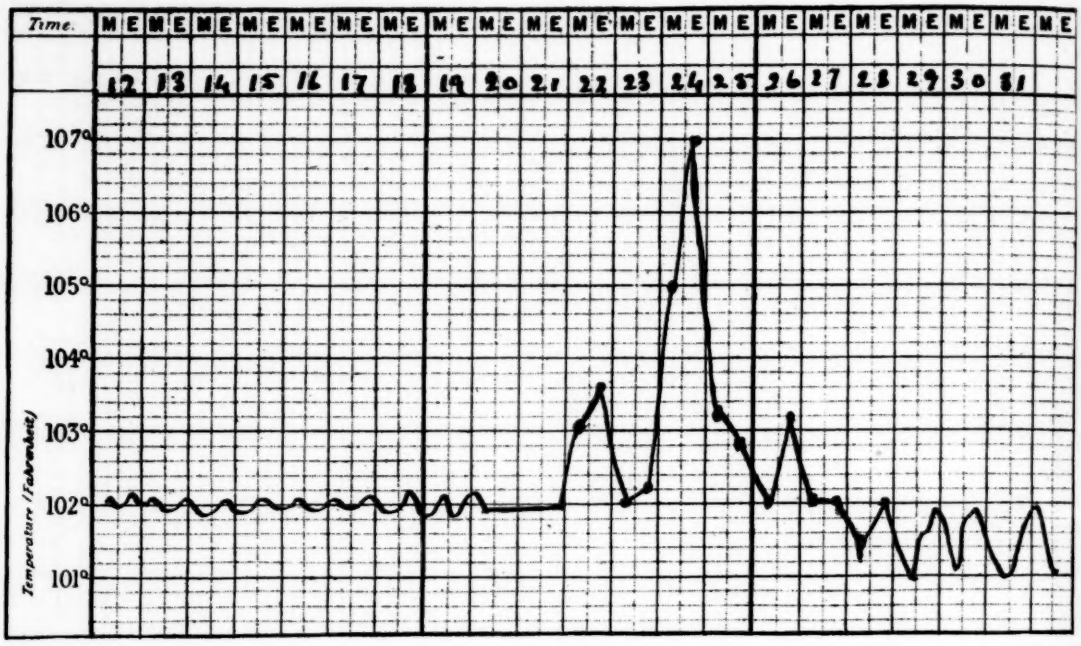
Temperature (Fahrenheit)

REDWATER. HEIFER 42.

Adults (punctata) placed on heifer on 12th October.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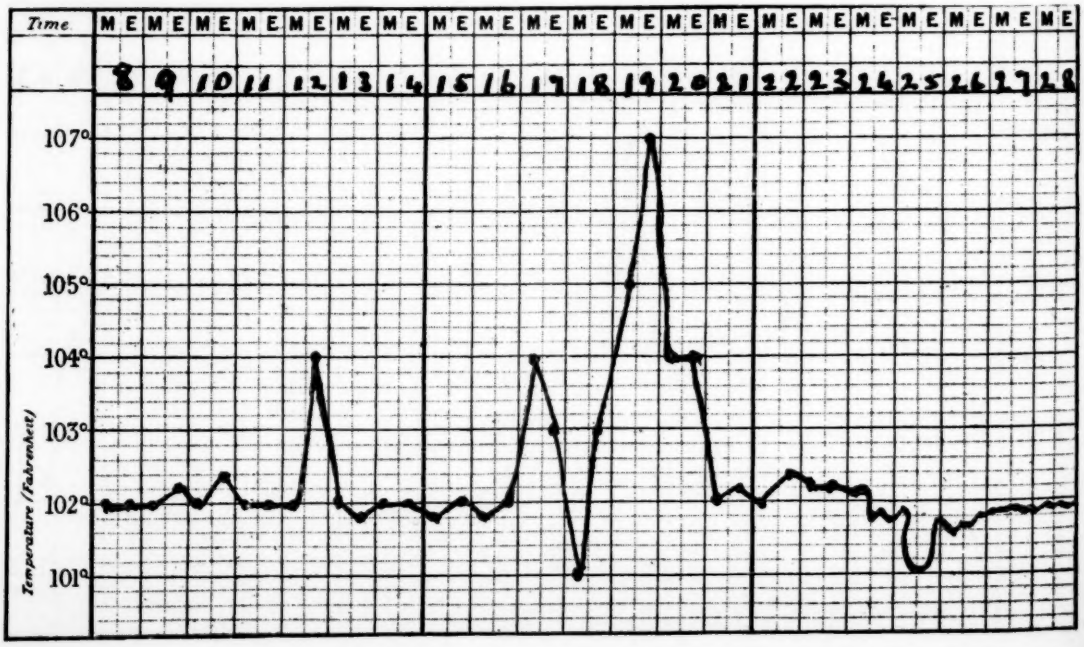
Temperature (Fahrenheit)

REDWATER. HEIFER 6a.

Adult ticks (punctata) which had been infected on Cow 2 put on this heifer 8th November.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107°
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102°
101°
Temperature (Fahrenheit)

for twenty days (see chart). Piroplasms were found in the red cells from the fifth to the tenth day after inoculation. Red water was passed on the eighth and ninth days. The red cells fell about two millions below normal. The proof is furnished then that English redwater is inoculable.

Several animals, however, reacted to inoculation feebly, while others apparently did not react at all. Feeble reactions and failures to react are capable of explanation in one of the following ways: (1) The blood used may have been of low virulence. (2) Too small a dose of blood may have been used, which in one sense at least is another way of stating (1). (3) The animal operated on may have had a natural or acquired resistance.

We have experiments showing that one may succeed with a large quantity of blood after failing with a smaller one.

We have also experimental evidence showing that a virus which produced a feeble reaction in moderate quantity, 10 c.c., caused a no more violent reaction when 100 c.c. were injected. Far from being a distinction between English redwater and the Texas Fever type of the disease, as one might possibly think from a perusal of general reports, it is really a point of analogy. My experience of South African redwater, however, as compared with English leads me to point out one difference which is not necessarily essential, and may be only one of degree, viz., that, whereas the difficulty in the former is to get recovered animals whose blood is of low enough virulence to make inoculation safe, it is comparatively difficult in the latter to get an animal whose blood is active enough to produce acute cases of redwater.

With regard to the third explanation of failure it is highly probable that some individuals may be naturally more resistant than others to redwater, just as one finds in the case of other diseases, but resistance of this kind is usually easy to overcome. Animals, however, which have recently recovered from a natural or experimentally produced attack, or which may have been exposed to infection on the pastures possess a high degree of resistance, although it does not always amount to an absolute immunity. We have several times, for example, failed to infect animals under the above circumstances with comparatively large doses of very virulent blood which produced decided reactions in clean animals, and we have in some cases produced a mild attack in a recovered animal by re-inoculation.

The most resistant animals of all have been some which were bred on a redwater farm.

I think enough evidence has been brought forward to establish English redwater in the class of inoculable piroplasmoses. It still remains, however, to show that it is tick-bone, the proof of which has so far not been furnished in relation to British redwater. It is well known, of course, that animals sick of redwater will not infect others when tied up together in a stable, and yet the disease is inoculable. Such a condition of affairs of itself immediately suggests that it belongs to that class of disease which requires an intermediary carrier.

A difficulty presents itself when one goes into the field to obtain ticks, for one finds on studying the life history of those present on cattle and sheep that they all belong to the varieties which require three separate hosts for their development, and pass through two moults away from their animal hosts before becoming fully matured. The disease in America, Australia, Africa, and Southern Europe is carried by varieties of ticks which go on to the cattle as larvæ, and the females only leave when they are fully engorged adults. This variety is easy to work with, and it is the progeny of the mothers which have sucked on sick or recovered cattle which carry the disease to other animals; that is to say infection passes through the tick egg. The three sucking varieties on the other hand require considerable experience and attention to get them through their various stages for experimental purposes, and the losses among them are very great.

In England I have met with only two varieties on cattle and sheep, the Ixodes Ricinus, and the Hæmaphysalis Punctata, both of which are three-suckers, and so far as I am aware, no tick requiring only a single host has been found on these animals.

In common with the experience of others the former variety has been found most often to be present on redwater pastures. I do not know if the latter has been observed in Scotland and Ireland, but although its distribution in England is much more restricted than that of the former, I have obtained it from redwater farms upon which the Ixodes Ricinus could not be found.

With the Ixodes Ricinus our experiments have been few, and at present it need only be said that they have failed up to date to show that infection passes through the eggs to the young ticks.

With the H. Punctata the experiments have been more numerous, and it seems probable in view of the similarity in the life history of the two varieties that what occurs with the one will hold good for the other. In testing whether a three sucking tick is a carrier of disease or not, one must experiment with it in each of its stages, for it has the chance of infecting itself on a suitable animal under three different conditions: (*a*) by sucking as a larva it might after moulting give the disease to the host upon which it sucks as a nympha; (*b*) by sucking as a nympha it might after moulting give the disease as an adult; (*c*) by sucking as an adult it might pass the infection through the eggs to the larvae which would then be infected.

The ticks used for these experiments were all bred from females matured on sheep, so that there can be no question of their having been infected in the field.

Experiments to Test Nymphae of Punctata which had sucked as Larvæ.

(1). A number of larvae were fed on Cow 2. Cow 2 at the time was about a month recovered from English redwater, and her blood was proved to be infective by inoculation.

The larvæ dropped off and moulted to nymphæ in about three weeks, and twelve days later about 50 nymphs were placed on Heifer 50. The nymphs engorged, and dropped off in the usual time. The result was negative.

(2). Larvæ were fed on Heifer 124 while she was showing a small number of piroplasms in her blood. They dropped off engorged in the usual time and moulted to nymphæ after about a month. On Heifer 48 were placed 350 of the above nymphæ; no reaction ensued, and no piroplasms could be found during 11 days, when another 300 nymphæ were put on. She was kept under observation for five months. The result was negative.

(3). On Heifer No. 170 were placed about 150 nymphs which had fed on Heifer 183 when she was showing piroplasms in her blood. The result was negative.

(4). On Heifer 168 were placed 200 nymphs fed as larvæ on Heifer 123 when she was showing piroplasms in her blood. They were put on nine months after sucking and six months after moulting. They attached themselves in the usual way and filled up. The result was negative.

I am not prepared to assert from the above experiments that nymphæ which have fed as larvæ on a sick animal never convey the disease, but it seems likely that they do not do so readily, and it may be here pointed out that the amount of blood taken up by larvæ is comparatively very small. It is also possible that the piroplasms do not develop inside the organs of the larvæ.

Experiments to Test Adults of Punctata which had Fed as Nymphæ.

(1) Nymphæ of H. Punctata were fed on Cow 2 (English redwater) when her blood was found to be infective by inoculation. They engorged, and moulted in about a month, and were almost immediately placed on Heifer 42. Her temperature rose to 103 F., on the tenth day and to 105 morning, 107 evening on the twelfth day.

A few piroplasms were found in the blood, but not until the fourteenth day. The result was positive in this case.

(2) A month after moulting 24 of the same batch of ticks used in the above experiment were placed on Heifer 6a. Her temperature rose to 104 F. on the fifth day. One pair of piroplasms was found on the ninth day—temperature 104. On the eleventh day the temperature was 105 morning, 107 evening, the piroplasms were distinctly numerous, and they could be found up to the sixteenth day.

Experiment to Test Punctata Larvæ from Mothers which had Fed on Infected Animals.

Adult punctata were placed on Cow 2 when her blood was known to be infective. They came off engorged in the usual time, but as the season was late, they did not lay until the late spring of the next year, and the larvæ did not hatch out until ten months after their mothers had engorged. On Heifer 125 were placed 200 of these larvæ. The heifer was kept under observation for three months, but the result was negative.

Treatment.

With regard to treatment there is little that I can say, and I prefer to leave this part of the subject to those who are going to continue the discussion. Ten of our cases of English redwater have required no more than careful nursing to prevent a fatal termination. Of course, it must be recognised that after a severe attack the consequent anæmia must be treated, but it is seldom rebellious.

It is frequently asserted that one must fear abortion as a complication of redwater, but none of our pregnant animals have aborted during an attack. We have observed, however, that œstrum is often delayed, and that when it does come on, the female generally returns once or oftener to the bull. I have also seen the sexual power of bulls materially weakened by an attack.

Prevention.

I wish only to speak in general terms on this part of the subject, as it is intimately bound up with the life-history of the ticks, and that alone would form material for a very considerable paper.

There are three methods under the head of prevention, which one may attempt to carry out.

(1) By inoculating with virulent blood all new animals before going on to the infected pastures, and nursing them, if necessary, through the attack, one may give them a degree of immunity to start with which will prevent them suffering severely from the infection conveyed by the ticks. The infected ticks themselves will keep up the degree of immunity so long as the animals are on the pastures. It is equally applicable to the above class of animal and to those bred on infected farms, that their resistance to redwater requires to be renewed by inoculation if they have been off the pastures for a time, during the winter for example.

It should be realized that by accepting the inoculation method one increases the animal's potentiality of infecting ticks, and one also makes up one's mind to accept the disease as a permanency. It should also be recognised, that so far as we know at present, the so-called immunity is not really an immunity, but is to be looked upon rather as a tolerance which depends for its continuation on the upkeep of the virus in the body. There is always a risk then, of this tolerance due to latent infection breaking down under the stress of other maladies which may attack the animal, difficult parturition for example.

(2) One may attempt to eradicate the ticks from the pastures and so dispose of the natural carriers, the only agents which convey the disease naturally. One attempts to get rid of ticks by fully stocking the pastures, and periodically dipping or spraying their hosts. The ticks under discussion, however, remain at each stage for a comparatively short time, 3 to 10 days, on their hosts, so that the chances of catching a large number at each dipping is not great, unless the bath or spray be resorted to at impossibly short intervals. There is no doubt, however, that by keeping up periodical dipping for some years one makes an impression on the number of ticks, but one cannot hope to completely eradicate them, as cattle and sheep are not their only hosts.

It will be gathered from the tick experiments that the seasons at which the adults are most numerous, should be those at which redwater is most prevalent. From observations on ticks bred in the laboratsry, and hurried, as it were, through their life periods, these seasons ought to be March to June and October to November; possibly when a searching inquiry is made into things as they occur in the field and under more natural conditions, the periods of greatest prevalence may turn out to be somewhat different.

The most important periods for dipping or spraying are when the adult females are on the animals, not because the operations will at first diminish the number of cases of redwater, for the ticks will already have inoculation their virus, but because the greatest benefit is to be expected by killing the adult females before they can lay their eggs for the upkeep of their species. The ticks in question remain for a longer time on their hosts when in the adult stage (10 days or more), and this is a further reason for pushing the dipping or spraying at this time.

The most useful agent for the destruction of ticks is an arsenical solution, or a paraffin emulsion. The effects of dips, however, are not very reliable, and no dip will keep ticks off for an appreciable time.

(3) One may leave the ticks to purify themselves by keeping cattle off the pastures.

Judging from the life history of the ticks under discussion and that of a similar variety with which I had the opportunity of experimenting in Africa, I think the period required would be about fourteen months. One could hasten the process, however, and at the same time utilise the pastures by fully stocking them with sheep, as these animals do not, of course, infect the ticks.

In attempting to deal with redwater in the preventive sense, it will no doubt be found that one of the three methods of prevention is more applicable to this or that district. Inoculation, I think, should be the last resource. A combination of (2) and (3) promises the greatest approach to finality, that is to say, cattle should be kept off infected pastures, which should be well stocked with sheep, and the sheep should be dipped at intervals of ten days, particularly in the season when adult ticks are in evidence.

That, gentlemen, is a short extract from the work which we have been doing on this subject.

I have very little to add to the paper except to state that I have been trying to co-relate the English redwater with the same type of disease found in other countries. Of course, there are huge areas where there are lots of ticks but no redwater; the redwater tick—as a tick—is quite harmless, but when diseased or newly recovered cattle are grazed on tick-infected pastures the

ticks become infected by sucking their blood. In South Africa the disease was unknown in many places until brought in by cattle from infected territory, after which the disease established itself in the clean ticks on the soil. This is an important point for us to remember, because if infected cattle were brought to this country from tick-infected pastures abroad it is pretty certain we should get the English ticks infected with the same form of the disease, which is far more fatal than English redwater. I am confident of this, because we have been able, experimentally, to convey by the English ticks the African variety.

I think it will be of interest to you if we here look at the various stages of the tick development, (specimens in small glass tubes passed round). I have had many ticks sent me by gentlemen in Devon and Cornwall, and I find that the tick I am now showing you, *Hæmaphysalis punctata*, is not common in these parts. The variety more commonly found here is the *Ixodes ricinus;* the punctata is more prevalent in the South East of England, but I have been able to prove that the life history of the two varieties is similar, and what I have found with the punctata probably applies to the ricinus. The female tick lays a large number of eggs, sometimes as many as 300. The time before hatching varies with the season ; some of the eggs may hatch quickly—say in a month—and the remainder much later ; the same applies to moulting. I have no explanation to offer why sometimes the hatching and moulting stop for months and then start again, but they do so, and this explains the odd cases one gets outside the real season of prevalence. The larvæ get on to a beast—but so far as larval infection is concerned in England, the results have been negative. With the tropical ticks of redwater, however, the life history is different. The ticks remain on one host, and the larvæ are capable of carrying infection which they derive from their mothers. The English larvæ now do the same as the adult ticks, viz., fill up with blood, swell and drop off. After a period they moult and become nymphs ; the nymphs get on to a beast again, fill up, drop off, moult and develope into flat ticks again—the adult. The same process is once more repeated ; the flat female ticks fill up on the blood of another host and drop off to lay eggs. The adult tick stays on the animal a longer time, as it takes longer to engorge. She is now a fully engorged female tick, and ready to start laying eggs. These eggs are hatched out about July. I have found that the tick can live through the winter in every stage of its development ; this probably explains why some cases of redwater occur in the winter, although few and far between.

The adult stage of the tick before engorgement is the most dangerous, the female is then in a position to cause redwater if she has sucked as a nymph on an infected animal.

What I particularly want to hear from the members of this Association is their experience of the life history of the tick, and the periods of the year in which they find the disease most prevalent.

Discussion.

The President : I am sure we have all heard Mr. Stockman with very great pleasure, I am afraid I have no information to offer as I have never seen a case of redwater in my district.

Mr. John Dunstan : Mr. President, I see by our agenda that Mr. Stockman wishes us to discuss four points :

1. *As nearly as possible times of year at which redwater is most prevalent.* Generally speaking, I think we may safely say the largest number of cases occur in the spring and autumn, although cases do crop up at all times of the year indoors as well as out. In my experience most cases occur in May, June, and July varying ing in different years according to the heat, for in the hot weather we do not hear of so many cases. During the last two months there has been quite an epidemic in my district.

2. *The kind of ticks found on animals at or about the time the attack comes on.* The kind of tick I have invariably found is the adult Ixodes ricinus : I have never discovered any ticks in the nymph stage on cattle ; usually there is a large number of adult ticks present, many of them being engorged females, but the majority are not engorged.

3. *The possibility of and utility of attacking redwater in one of the ways suggested in the paper.* To try to rid the country of ticks is a very great problem to tackle ; dipping is prohibitive because of the cost ; spraying may be practical if suitable appliances and solutions can be devised ; to clear the pastures and exterminate the infected ticks we must understand more of their habits and life history so as to attack them when they are in the most feeble stage.

4. *Any other points of interest connected with redwater.* I rather fancied myself a specialist in the treatment of the disease until this year, when I have seen more cattle die than in any other two years put together ; some cases died almost immediately on attack, while others lingered on and succumbed from exhaustion. I am looking forward with interest to hear the experience of other members on this point.

Mr. Penhale : I am afraid I cannot throw much light on the subject so ably introduced by Mr. Stockman. As most of you are aware, I live in a wild country district where I may say we have had redwater ever since I can remember. On some farms it is very prevalent, while on others adjoining it is never known. There is one large moor of about 360 acres near Dunsland Cross station where we used to get a great many cases during the summer months, but now only a solitary case or two appears there although the conditions are identical.

Mr. Stockman : Has the breed of cattle been changed ?

Mr. Penhale : No, the same strain are still sent there. My experience corroborates that of Mr. Dunstan in that during the last two or three seasons the disease has been more prevalent and virulent. I should like very much to find out why redwater is more obstinate when it occurs, as I find it very commonly does, about a fortnight or so after parturition.

Like Mr. Dunstan, I used to pride myself on my treatment : I usually give a purgative first and then follow up with styptics, such as Ol. tereb., Ferri sulph., etc., and then a stimulant, as Sulph ether.

Mr. Bloye : It should be gratifying to those who have been working at the subject to know that so many of our members have accepted the fact that redwater is a tick-borne disease. It must be admitted however, that —at first at least—the majority of one's clients were distinctly sceptical on the point, but the almost unfailing demonstration of the presence of ticks on the diseased animal has in most cases been convincing, and now there is no difficulty in inducing men to search for and remove all ticks from the patient as soon as symptoms of the affection are observed. One always searches for ticks, especially under the armpits, inside the thighs, and on the udder, and in an affected animal is rarely disappointed in his search. Cases, however, are encountered in which none can be found. I am able to corroborate Mr. Stockman's statement that Ixodes ricinus is the tick found on diseased animals in this part of the country ; indeed, in so far as I can remember I have never seen a specimen of the Punctata until to-day. I may mention the fact that up to the present I have not been able to trace any relationship between the number of ticks present on the animal, and the severity of the disease.

Our attention has been directed to the question of the kind of land upon which the disease is found to predominate. My experience has been that in the majority

of instances it prevails upon rough, coarse, and undrained land, and in this connection it would be interesting to hear from Mr. Stockman, whether he has any experimental data on the point, or failing this, his views as to whether drainage of such land would have any effect in reducing the number of ticks present. With previous speakers, I agree that redwater is most prevalent in spring, and in the late summer or early autumn.

In regard to prevention, it occurs to me that both dipping and spraying would be extremely difficult to effectually carry out, and that the average attendant could scarcely be induced to do these things thoroughly. The suggestion of the lecturer of purification of the ticks, by keeping cattle off the pastures until the infected ticks have have had time to die off, appeals to me as being the most practical. The economic objection to this course is perhaps considerable, but the pasture could be used for grazing other animals, and the loss thus be considerably reduced.

Reference has been made to treatment. In this regard probably most of us rely medicinally upon purgatives and styptics in some form or other. I do not wish to enlarge upon this point except to call your attention to an idea suggested to me some time ago by my friend Mr. Gibbings, of Tavistock, viz., that of transfusion. There certainly is much that is attractive in the suggestion, but I confess that I have not yet had the hardihood to carry it into practical effect. Perhaps in his reply, Mr. Stockman will be kind enough to give us his views upon this point also.

Mr. DOWN: I get a few cases but not many; those I do treat are generally in cattle kept on rough poor land. Some of my clients tell me that if they rear their own stock the disease very rarely appears, but if they buy any cattle, such cattle are almost certain to develope redwater; with other speakers, my experience has been that the disease has been very virulent this season. I have repeatedly watched for ticks, but in some cases have been unable to discover any. As a preventive I have suggested well greasing the animals, and should like to hear an opinion on that point.

Mr. PARSONS: I agree with other speakers that the disease is most prevalent in the spring and autumn. It may be my fancy, but I have often thought that the cases occurring in the autumn are not so acute as those in the spring. During the past season I have treated a large number of cases, but I noticed that after the few sharp frosty nights we had a little while ago, the disease practically stopped. I cannot say much about prevention, as this appears to be a very big question. In the first instance farmers will have to be convinced that the disease is caused by ticks, and that alone will take a considerable time. I have observed that after dressing certain infected pastures with lime there has been considerably fewer cases.

Mr. STABLEFORTH: I have had a good deal of experience of redwater in my district and find the disease most prevalent and virulent from May to August. I have always found the tick in its large engorged state, and was not aware until now of its presence in other stages of its development. I can bear out what has been said as to the presence of redwater on certain farms and not on others immediately adjoining, and even in particular fields on the same farms. I have most often found the disease associated with rough undrained land, and have also noticed that cattle brought in from another county are very apt to become badly affected. I remember one particularly virulent outbreak among fresh cattle when nine of the cases died. With regard to prevention, I am afraid that as long as farmers consider that 1lb. of common salt given in the early stage of the disease is sufficient to effect a cure, it will be difficult to persuade them to dip or spray.

I think drainage has an important bearing on the disease. On one farm I am quite familiar with, before being drained, the disease went through a whole herd of cattle, but since the fields have been well drained there has been a marked decrease in the number of cases. In treating the disease I commence with aperients and follow up with blood tonics, such as Liq. fer. perchlor and quinine, at the same time giving plenty of eggs and linseed to sustain strength.

Mr. E. DUNSTAN: I am afraid I have very little to say on this subject. We seem to have taken to the tick theory quite readily, but it is curious that certain fields are so dangerous while others alongside are perfectly free. My experience does not agree with that of most of the speakers, as I have found redwater occur in cattle kept on good old pasture lands as well as on the rough moors.

Mr. GIBBINGS: I notice in Prof. Stockman's inoculation experiments he states it was unusual to get hæmoglobinuria, and I presume the same applies to the disease conveyed through the agency of ticks, so that he relies solely on the presence of the piroplasms for the diagnosis of the disease. I should like to ask if he considers this type of redwater prevails under natural conditions? If so, it is rather extraordinary that one's attention is not often directed to such cases, for a bullock with a temperature of 104 for several days would hardly escape detection. I take it, too, this would be necessarily a very mild type of redwater, for a deep port wine colour of the urine would mean the destruction of a large number of the red corpuscles. Again, this possibly would account for the Professor's ten cases requiring, as he states, little or no treatment beyond careful nursing. This is not my experience in regard to the disease contracted under normal conditions. If the water leaves a deep crimson stain and does not change for four days, the case requires very careful handling to bring about recovery. I am convinced, too, that common salt given in doses of $\frac{3}{4}$ to 1lb.—repeated in twenty-four hours if necessary—has a marked effect on the course and termination of the disease, the only drawback to its use is the difficulty of administration. Unless freely diluted and given with some demulcent, the animal so resists swallowing that it is apt to get down the trachea. Although I have talked over the question of transfusion with Mr. Bloye I have not practised it, and should like to ask Mr. Stockman if he has any experience of the effect of transfusion of blood or of normal saline solution. I usually treat from 100 to 150 cases a year, and I find the prevalence of the disease varies with the weather. Some years redwater is prevalent before July, whilst in other seasons I have had more cases in September and October; a change of weather from dry to showery appears to hasten its development. In most cases of redwater I have found several of the blue ticks—the yellow variety are more rare, in my experience. If there are no ticks present one can generally feel where they have been attached to the skin.

For the reasons advanced by the Professor, inoculation with virulent blood is not likely to be satisfactory as a preventive; I have known instances, too, where a bullock has contracted a second attack during the season, and I also remember a cow having redwater three years in succession. Apart then from the more serious objection of "keeping up" the infection, the immunity is not absolute. To effectively spray a large number of bullocks every ten days would be a tall order, and even then would it be successful? A small farmer sought my advice last year, as he had hired some redwater land. I recommended him to dress his two cows and six heifers with 25 per cent. paraffin—this he did regularly twice a week from June to September, and in August one of the cows came down with redwater; he states at each application he found large numbers of ticks.

To advise a farmer to clear out the whole of his cattle including cows, calves etc. at a sacrifice, and graze with

sheep for 14 months—for which his farm may be ill-adapted—would to my mind be a costly experiment, even if this procedure would eradicate the infected ticks. I presume there would be no guarantee against his land being again contaminated; or what is a still more serious objection, when he re-stocks his farm with cattle purchased in the open market, how is he to ascertain whether they are clean? More likely than not he would buy some "recovered" bullock, or others that may have been located on tick-infected pastures. Now I should like to ask Prof. Stockman how he accounts for some farms being addicted to redwater whilst the adjoining land, with the same geological formation, is comparatively free from the disease? Even if redwater be introduced on the latter pastures the affection appears to die out—I mean it does not become endemic. Possibly the answer will be that the infected ticks are exceedingly plentiful where the disease is rife. That is not my explanation.

If I had a grazing farm given to redwater and wished to reduce the number of cases to a minimum, I should proceed as follows: At this time of the year I should feed all the grass down very closely with sheep, so as to allow the land to get the full benefit of the frost. In the Spring I should apply a liberal dressing of lime—say 50 bushels to the acre. The next year I should treat similarly, with the exception of substituting 6 cwt. of salt for the lime. I do not for one moment argue that this would destroy the ticks—for they appear pretty tenacious of life—but I believe that this system of farming would so improve the nutritive value of the herbage that the cattle would be able to resist infection from these hæmatozoa. In my humble opinion the most reliable and least costly way to prevent redwater is to farm the land well.

Before sitting down I should like to ask Prof. Stockman if the carcase of an animal suffering from redwater is fit for food, or how soon after an attack it would be fit?

Mr. BOND: Our thanks are due to Mr. Stockman for coming down from London to open this discussion for us. The subject is a very important one to us in the West Country, where the disease is so prevalent. With regard to the first point—I find the disease prevalent in the Spring, but more so in the autumn. As to the second—The Ixodes ricinus is the variety of tick commonly found here; when I have been unable to find the ticks themselves, on an animal suffering from redwater, I have always found the cicatrix caused by them, underneath the flank. The third point opens up a very big question, because of the prevailing custom of sending large herds of cattle from the home farms to Dartmoor, in the summer; they go there when the grass is dry and return in the autumn, and we then get the most cases; the owners consider that the disease is brought back from the moors, and that it developes when the cattle get home. I do not think that the quality of the soil on which cattle are grazed has much bearing on the disease, for it occurs on all varieties of pastures. Recently the idea has gained ground among farmers that there are two kinds of redwater, the kind now prevailing being a fresh variety and more virulent.

With regard to treatment, the oldest remedy I know is a quart of table salt mixed with lard and honey to make it more palatable; on the Cornish coast they used to treat with red herrings and pilchards boiled in milk with honey added. I think ordinary table salt is of far more service than Mag. Sulph.

I shall be particularly interested in Mr. Stockman's reply to Mr. Gibbings' inquiry as to whether the meat of a redwater beast is fit for food, and if not when it becomes so?

I think the greatest difficulty in accepting the tick theory is the fact that only certain fields on a farm may be infected and others not; a gate hardly seems sufficient to keep the ticks from crossing. As a prevention I have tried ordinary sheep dip as a wash, but I cannot say I have seen any real benefit from it as yet; this may be owing to the difficulty of getting one's instructions carried out thoroughly. My experience is that every breed of cattle seem equally susceptible to the disease.

Mr. OLVER: Mr. President, Mr. Stockman, and gentlemen,—So much has been said already that I am afraid I cannot add more. I get a lot of redwater in my country, but the majority of the cases are treated by the owners, and as a rule cured by the administration of salts, etc. When they are beaten they send for me. Some of the best farms I know, with good land—beautiful land, are badly affected with the disease. So accustomed to it are the owners that they actually watch for the first signs of an outbreak, and I have known them send in to my place for medicine for as many as a dozen cases at once.

When I was at College I was taught the undrained theory, but I do not now think there is much in it. I was reared on a farm, and as a boy—somewhere about 50 years ago—I never remember seeing a case of redwater there. About that time my father took one of the rough moorland farms, of the type alluded to by previous speakers, to graze his cattle on for a term of 14 years, but he lost so many head of cattle owing to the prevalence of redwater that he was obliged to give the farm up at the end of seven years. The curious thing was that the cattle did not bring the disease back to the home farm, although of course they were frequently to and fro. My brother has since held the same home farm, and on enquiry some little time since he told me he had never seen a case there.

Years after, when I went to Truro in practice, I found very good land around there to be badly infected; and I have also noticed the peculiarity previously mentioned as to infected fields being sandwiched between non-infected fields, with free interchange of cattle over the whole.

About two days ago I saw a bad case in a cow after calving, but such cases are not common with us; this cow had been brought in fresh from a non-infected district. I think the disease is spreading; at any rate farms now get it that were always considered free, and I am certain that thousands of cases occur and recover spontaneously without being noticed by the owners; for instance, I was asked by a farmer the other day to look at his cows, as he thought there was something the matter with them but did not know what, I asked him if he had ever had any redwater, and he replied "Certainly not." I said "Well, drive those two into that pool of water"—which he did, when they soon made water and proved to be typical cases of redwater.

Mr. ASCOTT: I have not seen a case of redwater in my district for many years, although when I had a branch practice at Torrington—only seven miles away—I used to get many cases there, and I believe my friend Mr. R. E. L. Penhale, who is now at Torrington, still continues to get them, and I am sorry that owing to his being very unwell he is unable to be present to-day to give us the benefit of his experience.

Redwater used to be very prevalent about 14 years ago, on one farm in my neighbourhood particularly in the months of June and July. It was confined to one marsh adjoining the river, which is a tidal one, and frequently became flooded.

Mr. STOCKMAN: With salt water or fresh?

Mr. ASCOTT: The flooding took place at high tides, when the water would be brackish. The farm at that time changed hands, and owing to the evil reputation of this marsh the new tenant avoided stocking it with cattle during the period the disease was known to prevalent, but stocked it with sheep and horses instead; this practice he continued for seven or eight years, when the farm again changed hands, and the present tenant now stocks

the marsh in the same way as the rest of the farm, and so far he has had no cases of redwater.

Mr. STOCKMAN: That is a strong argument in favour of my plan for prevention.

I am exceedingly obliged for the very excellent discussion we have had; if one confines oneself too closely to the laboratory observations one is apt to fall into errors of interpretation, unless one's observations are confirmed in practice. Several speakers have borne out what we have found in the course of our laboratory studies in connection with ticks, whilst many new points have been raised. As regards redwater land, I have had infected ticks sent up from good pastures as well as from poor moorland, which proves that ticks are not confined to any particular sort of land; drainage and other methods of improving the land are, of course, quite the right and proper lines to pursue, but these methods give no guarantee against tick infestation. In the laboratory we have bred the ticks quite independent of the quality of soil, and they will lay and moult freely even on bare earth.

The fact of finding the disease more prevalent in May, June, July, and August corresponds to the life history of the tick, that being the period of the year when adults might be about. It will suit me here to reply to Mr. Gibbings' query, as to how long an animal remains infective. I killed an animal the other day infected with Texas fever two years ago, and found the blood still virulent. I have also in the laboratory an animal which was infected with African redwater over a year ago and the blood is still virulent. I have never had a case of English redwater where this virulence remained for anything like a year. The longest periods I have observed have been about two to five months—showing in this respect a marked difference between the English and tropical forms of the disease.

With regard to second attacks not necessarily being due to fresh infection, I may say that when two cows I got up from Mr. Gibbings' district had recovered about a month I decided to infect ticks on them. In error, a large number of larvæ were put on and the animals became plastered all over with adult ticks. These larvæ were of the one sucking variety from abroad, but since their mother had come off a horse, they were clean, nevertheless, the two cows developed a second attack of redwater owing to the lowering effect of the ticks.

It does not follow that because an animal developes redwater in the stable that it has been recently infected; it may be that the disease had lain dormant for a considerable time and only became active when the vitality of the animal had become lowered and consequently less able to keep the piroplasms in abeyance. We often find redwater develop in animals arriving at our ports for slaughter, when no ticks can be found on them. Here, again, I think it is owing to the upsetting effects of the voyage so reducing their vitality that the dormant disease is enabled to re-assert itself.

As regards prevention by spraying, I think most speakers have taken too hopeless a view of the difficulty, a very efficient pump can be procured which will spray an ordinary animal in two minutes; the principal difficulty is to get a dressing that is really effectual in killing the ticks. The main idea of spraying, one must note, is not the immediate cure of redwater, but to kill the ticks, and thus reduce the chance of future infection; even although after spraying some of the ticks may be alive, it has been found that many of them drop off and die before laying. To get really effectual results the spraying must be continued for about two years, but it is only on certain farms it may be found worth the trouble and expense of doing it. New developments are now being witnessed on some of the Coast farms in South Africa which had been given up owing to the enormous number of fatalities caused by redwater and other tick diseases, the farms are being taken again, and on them large dipping baths have been constructed. The cattle are periodically dipped by being driven through these tanks containing a strong solution of arsenic, and the results are said to be encouraging. It is wonderful how strong a dip can be used with apparent safety. I myself have seen over 10,000 cattle dipped in this strong arsenical solution without a single accident, but a rude awakening generally comes one day with these strong solutions, and a heavy loss may be incurred.

As regards certain fields being infested and others adjoining not, this is very difficult to explain; but the English ticks being three suckers do not stay on an animal long, and so do not get carried far. This makes it difficult to infect new ground; but there may be other reasons yet to be inquired into.

I agree with Mr. Bloye that the number of ticks found on an animal has no relation to the severity of the attack; it depends, I think, on the virulence of the piroplasms, in which there is a great difference. I am very hopeful as to the method of prevention by keeping cattle off infected pastures, and introducing sheep; I do not for one moment suggest the entire un-stocking of the whole farm; but one can begin with one field at a time, and continue field after field until the whole has been completed. Once get thoroughly rid of the infected ticks it is not an easy matter to re-infest the fields if care is taken not to introduce infective cattle.

I am very interested to hear of the effects of dressing pasture land with salt. At college we were all taught that land infected with parasitic disease should be treated with salt, but I must say in practice I have been rather disappointed with the results.

I did not know that redwater was so much more severe in its attack after parturition, until now; the only explanation I can offer is that the act of parturition pulls the animal down—reduces its vitality, and thus renders it more susceptible to the attack.

Transfusion has been mentioned; I have had it in my mind to try transfusion of physiological solution of salt, but as yet I have not done so, as our study has not been so much the treatment as the development and spread of the disease. I should not be surprised if transfusion had good results in anæmia cases. I have recently had occasion to look up treatment, because the other day I inoculated ten valuable animals that are going abroad to be exposed for observation on infected pastures. The best results seem to have been obtained with hypodermic injection of 3-4 grs. Hyd. Bin-iodid., and Iodide of potassium.

With regard to frost: I can quite understand that it may put an end to an outbreak of redwater, as this is in accordance with the life habits of the ticks. In cold weather they stop biting; we used to find in Africa that we had to stop our tick experiments during cold weather, and it is also true that here ticks bite less in cold weather.

Mr. Stableforth mentioned that a new resident introduced the disease on a farm in his district by bringing on new stock. Without knowing the previous history of his cattle I am unable to say why this occurred, it is probable that he did not infect his land, but that the land infected the new cattle. In practice, we find that many cases pass unnoticed; even on our experimental farm we have found that many of our inoculated cases would never have been noticed by the cowman had it not been for our routine practice of taking the temperature of every animal on the farm, night and morning.

Mr. Down asked as to the value of dressing with grease and oil; it is useful enough to do this, but surely it is much more trouble than spraying. Grease dressings are said to clog the pores of the ticks.

Before concluding, I would like to impress the point that the mere fact of redwater appearing in animals after

dressing proves nothing against dressing or spraying: the object of the dressing being to kill the ticks and thus remove the probability of future attacks.

With regard to the question as to whether the flesh of an animal suffering from redwater is fit for consumption—in my opinion such flesh is not wholesome, nor marketable, particularly so if the disease is present in its chronic form; the flesh is watery looking and dull red in colour, and if exposed for sale an inspector probably would not pass it.

A hearty vote of thanks was accorded Mr. Stockman on the motion of the President, seconded by Mr. Bloye.

NEW MEMBER.

Mr. A. E. MASSY, of Dirreen, Berrow, Burnham, was proposed by Mr. Bovett, seconded by Mr. Ascott.

WILLIAM ASCOTT, Hon. Sec.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

A meeting was held in the Imperial Hotel, Darlington, on Friday, October 23. Mr. John Wilson presided. There were also present: Messrs. J. H. Taylor, C. G. Hill, and W. N. Dobbing, Darlington; P. Snaith, A. C. Forbes, Bishop Auckland; W. H. Blackburn, Barnard Castle; E. H. Pratt, Northallerton; and W. Awde, Stockton-on-Tees. Visitor: Mr. Thomas.

Apologies for non-attendance were received from Messrs. E. R. Gibson, Seaham Harbour; A. Peele, Hull; and H. Peele, Durham.

Mr. DOBBING proposed, and Mr. Hill seconded, that the minutes of the previous meeting be taken as read and confirmed. Carried.

CASES.

Mr. HILL showed fractured femur of dog which had been lame for three months, but could occasionally use it fairly. He was asked to examine it, and diagnosed fractured head of femur.

Mr. PRATT was called to a horse 12 years old, which was noticed not to eat his hay well in the morning. At noon his right ear was drooping and the lips drawn to one side; temperature and pulse were normal, and it had evidently come on suddenly. Gave physic ball followed by tonics—Iron and Nux vomica. No history of an accident of any kind.

Mr. DOBBING had seen a similar case, but as owner declined to have it treated it was destroyed.

Mr. AWDE had seen cases of the kind and usually found that they arose from pressure caused by Psammomatous tumours.

Mr. SNAITH had seen a case recently in a colt, the lower lip was pendulous, but the upper lip was drawn and the muscles on the side of the face were paralysed. He blistered side of face, and for a few days he seemed to do well, but eventually was taken for a drink to the pond when he fell in and died.

At 9 p.m. one night the previous week he was called to a mare and found her standing in a box eating hay quite unconcernedly, but when asked to move, her near fore-leg came up suddenly just like a case of stringhalt, and the near hind leg was spasmodically affected in the same way. Her near eyelid was closed. Gave Nux vomica and belladonna, and would tell the members later on with what result.

Mr. WILSON remembered a somewhat similar case, and it was a very hot day when it occurred. She was kept in a dark box and very quiet.

He had met with extensive kidney mischief lately in several post-mortems in both cattle and horses. In some the deaths were rather sudden, and in two an analysis had been made of contents, but no poison could be detected. He thonght it might be due to the use of foreign cakes and meal.

Mr. HILL had met with quite a lot of cases of mammitis in cattle. Some forming abscesses, other becoming indurated; in others they turned black and soon died from gangrene.

Mr. FORBES was called to a cow which had calved a month before her time and was down on the floor, like a case of milk fever. As she had not cleansed he removed fœtal membranes and inflated her udder, and she got up and did well. In a month, however, he was called to her again in a similar state. He adopted same treatment again, and she ultimately recovered. She was down twice in five weeks.

The HON. SEC. mentioned having seen a cow which went down before calving and then again after she had calved and ultimately recovered.

Mr. HILL had also seen one or two similar cases.

Mr. PRATT had a cow down on the floor before calving. The owner told him that there was no calf, but next morning when he examined her found that she had torsion of the uterus, and when the calf was delivered she did all right.

Mr. TAYLOR mentioned an outbreak of disease amongst pigs in which 12 died, but there were no post-mortem lesions of swine fever present as one would naturally expect.

Mr. SNAITH mentioned salt-poisoning amongst swine.

Mr. WILSON vacated the chair in favour of Mr. Forbes, the President-elect.

Mr. SNAITH proposed a vote of thanks to the retiring President for his services during his year of office. This was seconded by Mr. Forbes and carried unanimously.

Mr. WILSON having replied, Mr. Forbes then read his inaugural address.

PRESIDENTIAL ADDRESS.

A. CAIRNS FORBES, M.R.C.V.S.

Gentlemen,—My first duty is to thank you for the honour you have shown me in electing me as your President for the ensuing year. I feel that it is quite an undeserved honour, but I shall try my best, during my term of office, not to forfeit your esteem and regard. The meetings held here are always pleasant—there is such good fellowship among the members that I feel it is a privilege and pleasure to attend them. The only drawback is that there is as a rule only a small attendance. That, however, seems to be general among similar Societies so that we are no worse off than our neighbours. It is a pity that some members do not make an effort to come occasionally. They would be amply repaid, as the subjects discussed are generally of an interesting and instructive nature. And apart from that side altogether there is the social aspect. Our quarterly meetings engender feelings of frieudship among us which are bound to make for good in our professional relationships. If there were larger attendances at the various Societies throughout the country, I venture to say we should hear less of breaches of etiquette than we do.

It is the custom in addresses of this sort for the president to speak on affairs of importance which are happening in the profession. At the present moment as you are all well aware, the Veterinary Surgeon's Amendment Bill is *the* subject which is exciting a lively interest among us all. There is much that has been said, and much that has been written, both for and against it, and by eminent men, equally eminent I may say on both sides. The opponents of the Bill have issued post cards to every member of the profession asking those who are opposed to the Bill, to say so; but so far they do not

seem to have arrived at a very definite conclusion as to whether the majority are against it or *vice versa*. Judging from the last Council election, it at first sight looked as if the majority was against it, as some of the strongest opponents of the Bill got a great many votes; but against that of course there is the personal element, which enters very largely into an election of this kind. Speaking for myself, I am strongly in favour of the Bill. It is I think pretty generally conceded that more money is required, and to me this seems a fairly good way of getting it. I say a *fairly* good way because it has undoubtedly some disadvantages, but on the whole I think it is as good a scheme as it is possible to evolve. Members of the legal profession have a much bigger license to pay every year than we shall if this Bill becomes law, and after all is said, I don't see how any man can grumble at a guinea a year. The veterinary profession suffers yet from a number of disabilities. We want these removed; well, we must pay for this, and if we had a fund such as this guinea a year would give us, it would enable us to fight against these disabilities, and in the end take a higher position in the eyes of the public. For instance, the question of veterinary surgeons being exempted from serving on juries. This question to me seems a small one, but a great number of my professional brethren seem to regard it as a crying injustice. I am old-fashioned enough to think that every man, no matter to what station in life he belongs, when called upon should take his place on the jury. I admit however that when the law exempts the medical practitioner from serving, we as veterinarians are entitled to the same exemption, and we should strive our hardest to be put on the same footing.

The arguments in favour of the Bill have been put forward many times and by those more able to deal with the subject than I am, and you are all doubtless tired of the matter. Therefore I do not propose to take up your time by discussing it to-day. Suffice it to say that in my humble opinion we shall be very much better off in more ways than one if the Bill passes, as I sincerely hope it will.

During the last dozen years or so the veterinary profession has made great strides from a scientific point of view. A better educated type of veterinarian is taking the place of the old cattle doctor. New discoveries in veterinary medicine are constantly being made and given to the profession, with the result that the public is looking more to the veterinary surgeon to guide it in the care of its stock than formerly. We shall, of course, never be able to put down quackery. I don't harbour any sanguine hopes that even the Bill will help us in this—at least not very much—but as people become better educated they will appreciate a better educated veterinary surgeon who can make himself indispensable to them. And so as the years roll on will come the downfall of quackery.

The problem of tuberculosis is one which has engaged the earnest attention of scientists in both the medical and veterinary professions, and until this disease in cattle is scheduled as a contagious disease and treated as such in a broad and generous spirit it will never be stamped out. The treatment of tuberculosis in the human subject is a difficult matter to deal with, and I shall not enter into it. As far as I can judge the only effort made to prevent the spread of the scourge is by putting up in post offices and other public places notices prohibiting spitting.

And now a word as to the future. It has been said by an eminent politician that it is never safe to prophesy unless you know. I have observed from time to time in reading the veterinary periodicals that certain prophets have arisen amongst us, who, in spite of the aforementioned dictum, have predicted troublous times in store for the veterinary surgeon of the future– and the near future. The advent of the motor vehicle has, without doubt, swept off our public streets a great number of horses. I read some rather remarkable statistics a few weeks ago showing a large decrease in horse drawn vehicles and a very large increase in motor vehicles in the metropolis. This will doubtless apply, though probably in a less degree, in other towns and to some extent in country districts. This sort of thing is undoubtedly disturbing, to say the least of it, but I fancy that as time goes on the friend of man, the poor old horse, will be in as great demand as ever. The day I trust is yet far distant when hunting and racing will be things of the past. And in any case, if the horse does pass, which God forbid, we have still left us other animals to give our attention to. They have not yet invented a motor cow, while the smaller animals make quite a lucrative living in some districts. Under Municipalities there are some good appointments already. As time goes on these will tend to increase, and on the whole I think the veterinary surgeon of the future need not fear. He will surely make a living, as his progenitor has done in the past.

In conclusion, gentlemen, allow me to thank you for your patient hearing to my rather rambling remarks.

Mr. FORBES was accorded a hearty vote of thanks, proposed by Mr. Wilson, and seconded by Mr. Hill.

The TREASURER submitted his financial statement of accounts for the past year showing a balance in hand.

Mr. BLACKBURN proposed that the Treasurer's report be received and adopted, and the accounts be paid. This was seconded by Mr. Wilson and carried.

Mr. BLACKBURN produced the bladder and penis of a tup, in which there was a calculus in the first inch or two of the latter organ.

The members subsequently had dinner together in the hotel.

WM. AWDE. *Hon. Sec.*

Action for Slander against a Veterinary Inspector.

The following is a specially-prepared report of an action of interest to veterinary surgeons and inspectors, as well as to fleshers and the public generally. The action was at the instance of John Gordon, Flesher, Greenock, against John Donaldson Pottie, Veterinary Surgeon carrying on practice in Greenock, concluding for £500 damages for alleged slander. After a three days' trial (judge and jury) at Edinburgh, the jury returned an unanimous verdict on Thursday, 26th ultimo, for the pursuer on six of seven issues submitted to them, and awarded him £150 of damages besides expenses. The first and principal issue was whether on 15th, February last the defender falsely, calumniously and maliciously stated to James Devine, sanitary inspector of the burgh of Greenock, of and concerning meat which the pursuer had in his shop, and was exposing for sale, that it was unsound, and unfit for human food, or used words of the like import and effect, to the loss, injury, and damage of the pursuer. The other issues were in similar terms, but referred to statements said to have been made to the Medical Officer of Health, the Chief Constable of the burgh, and to other persons in Greenock. For the defender there was submitted a counter issue which put the question whether on the date mentioned the pursuer had in his shop and was exposing for sale meat which was unsound and unfit for human food.

The pursuer's case was that the defender acted as veterinary inspector for the burgh of Greenock prior to June, 1907, when he resigned owing to alterations in the terms of his appointment; that subsequently Mr. Peter M'Intyre received the appointment; that on February 14 the pursuer bought two fore-quarters of an animal

which had been removed from a neighbouring farm, and which had been dressed at the burgh slaughterhouse under proper supervision, and passed by the inspector (Mr. M'Intyre); that on a visit the pursuer was urged by the defender to send back to the slaughterhouse the said fore-quarters as unsound and unfit for human food, and to state that portions thereof sold to customers had been returned to him by them as unsound; that the defender's purpose, as stated by him to the pursuer, was to get Mr. M'Intyre into trouble for passing unsound meat; that the pursuer refused to return the said meat, as it was quite sound and fit for human food, or to make the statements requested, as they were contrary to the fact, or to assist the defender in his scheme in any way; that the defender expressed his annoyance at the pursuer's refusal, and left him threatening to make trouble over the matter; and that the pursuer believed and averred that the subsequent proceedings of the defender, as condescended on, were taken by the defender to gratify his ill-will conceived against the pursuer in consequence of said refusal, and in pursuance of a design to injure the pursuer and Mr. M'Intyre.

In answer the defender stated that on February 14 he received information from a local flesher that a portion of a carcase had been sent from the slaughterhouse to the pursuer's shop, which was unsound and unfit for human food, and that the remaining portion of the carcase, with the organs, had been condemned—the informant suggesting that the defender should look into the matter; that on receiving said information the defender, who was aware that the pursuer had twice been convicted for selling unsound meat, communicated with Mr. Devine, sanitary inspector of the Burgh of Greenock, and mentioned to him that he was informed that there was meat exposed for sale in the pursuer's shop the soundness of which was open to doubt; that Mr. Devine promised to attend to the matter; that early in the forenoon of Feb. 15 the defender went to the pursuer's shop, where the pursuer's brother showed him two pieces of meat which he said had come from the farm in question, that from the appearance of the meat the defender formed the opinion that the pieces shown him were unsound and unfit for human food; that he endeavoured again to communicate with Mr. Devine on the subject, but unsuccessfully; and that the defender then telephoned to Dr. Cook, the Medical Officer of Health for the Burgh of Greenock, and told him what he knew of the meat and what he had done, expressing his opinion as to its soundness, and leaving it to him to arrange with the sanitary inspector and the slaughterhouse inspector for an examination of the said meat.

Further, the defender pleaded that he had not slandered the pursuer; that the statements made by him were true; and, separately, that he was privileged and had acted without malice in the discharge of his duty and in the *bona fide* belief that what he said and did was justified by the facts.

A total of twenty-two witnesses were examined for the pursuer—including Mr. Trotter, Veterinary Inspector for the Corporation of Glasgow; and Dr. Cook, Medical Officer of Health, Mr. Devine, Sanitary Inspector, and Mr. M'Intyre, Veterinary Inspector—all for the Burgh of Greench. Mr. Trotter stated that he examined a piece of meat submitted by Mr. M'Intyre on February 20, and found it of good colour, free from abnormal odour, that on microscopical examination it was found to be free from bacteria, and that he considered it fit for human food. Dr. Cooke spoke to messages received by him from Mr. Devine and the defender, and also to having visited the pursuer's shop and examined the whole of the meat therein, without finding any of it unsound; and Mr. M'Intyre said that after examining the carcase in question he passed the two fore quarters, his opinion being that they were sound and fit for human food; also that along with Dr. Cook he had examined all the meat in the pursuer's shop and had fonnd none of it unsound.

For the defender, Dr. J. H. G. Whiteford (D.P.H.) stated on Feb. 17 he bought two pieces of meat at the pursuer's shop, and that he found them sticky to the touch, of disagreeable odour, and dark in colour, and that they were in his opinion unsound and unfit for human food. Principal Dewar, Edinburgh, said that he examined meat forwarded to him by the defender and that he certified it as unfit for human food; and Mr. Miller and Mr. M'Cluskey, veterinary surgeon, Paisley, gave evidence similar to that of Principal Dewar.

Mr. Wilson for pursuer: Mr. Watt for defender.

Judge's Charge.

Lord Guthrie: Gentlemen of the Jury—I agree with Mr. Watt in the matter of the questions which are raised in this case, but I cannot agree with him in the view that the matter is important only for the defender. There have been suggestions as to the pursuer acting here not for himself but for a Butchers' Association. Of that it is sufficient to say there is no evidence whatever, and it would be quite unfair to take the case on that basis. It is easy to make suggestions, but those who make them have got to prove them. The suggestion has been made. No proof whatever has been led before you. It is easy to say that, in the case of a skilled butcher, they don't charge him in the issue with knowing that the meat was unsound, but, gentlemen, if the view presented by the defenders of the condition of the meat which he was selling was correct, he must have known it was unsound, because we are told that not only would he know, and skilled people like him, but that anyone would know, and its condition was so bad, the defenders say, that, as Principal Dewar puts it, nobody would buy it. Nobody, if they did unwittingly buy it, would take it home, so that it is quite clear the case is a very important one for both the pursuer and the defender. It is an important one for the community. It would be very unfortunate if ratepayers who had reasonable ground for suspicion that bad meat had been passed in the slaughter-house, and was being exposed for sale, were not to be entitled to go to the proper authority and to suggest to them, to require them, that they should at once make enquiries. On the other hand, it would be very unfortunate that ratepayers should be able, without any reasonable cause, to ruin a man who is carrying on a respectable trade in a respectable way. And I think also, gentlemen, you will agree it would be unfortunate if countenance was to be given to the view that in every case a carcase must be rejected *in toto*. There is no doubt whatever that a very large amount of the meat in this country is sold, and properly sold, although portions of the very carcase thus sold have not been allowed to be sold, not merely entrails but actual portions of the flesh which from one cause or another may have been condemned as unsound.

Now, gentlemen, that being so, there are a number of questions here involved that you have got to consider. The ordinary question which gives trouble wont trouble you, because the ordinary question is, what was said on the occasion in question. Well now, there is no doubt whatever of what was said, because the counsel for the defender have admitted in one breath, although Mr. Watt has tried to take it back with another, that the issues accurately state what was said. He said, and still maintained, that his client had only to Mr. Devine expressed a doubt and suspicion about the meat. That won t do. He had admitted that his client made a totally different statement, different not only in degree but in kind, and stated to Mr. Devine as a positive assertion of fact that the meat was unsound which the pursuer was exposing for sale, and was in fact unfit for human food. Now, it won't do to say that he is not going to split hairs. That is how Mr. Watt put it. He would require to split

a good deal more than a hair if he is going to say that these two statements are the same. They are essentially different, and you will take the case on the footing that the first five issues and the last—the seventh—are accurate representations of what was actually said by the defender to Mr. Devine, to Dr. Cook, to Chief Constable Angus, to Joseph Mackay the Police Constable, and to Mr. Smith the Town Councillor and Member of the Board of Health. That question therefore one puts aside, only reminding you, as I have already done, that the statement is in relation to a butcher, not in relation to a private individual who happens to have on his premises unsound butcher meat, but in relation to a man of skill who must know whether meat was sound or unsound, if it was in the condition which the defender says, you have got to consider the case in view of a very serious allegation being made. Assume then, gentlemen, that these words were said. The defender has a complete answer, if you are satisfied of its accuracy. He says the statement was true. Now, gentlemen, if it was true, you have nothing to do with his motive. It may have been as sinister as anybody could maintain. It may have been as pure as the defender's counsel has maintained. It does not matter, if the statement was true, although made from the worst of motives, he is entitled to your verdict. And the first question in ordinary sequence is, is the statement true? Now, what does that mean. That means, has the defender proved to your satisfaction that meat there exposed was in point of fact unfit, was in point of fact unsound. Well, gentlemen, consider what that means. You and I may think that it would have been safer, wiser, for Mr. M'Intyre and Mr. Howard and the others who had to do with the slaughterhouse arrangements to have said—Well, there is no doubt about this carcase, we will not allow any of it to go out. That is not the question. I fancy many people might think that, when there was a sufficient doubt to make it desirable to say—Well, we will not send any of it out. That is not the question. The question is, has the defender proved to you—and it must be beyond reasonable doubt—that the meat was unfit. I take it, gentlemen, that the question is very much the same as if we were in a criminal prosecution; and the evidence must be equally clear and equally satisfactory, because of course it is a very serious charge, for it is a criminal charge and might have been so dealt with in another Court; and the question then comes to be, has he proved or has he not? Well now, I think you will agree with me in this, that if a man in the position of a veterinary surgeon is going to bring a charge of this kind he is bound to observe certain rules. Some of them are in the statutes that are referred to, but they are really common sense. The first is that he makes certain that the meat submitted to the experts whom he is going to consult is the same meat as was exposed for sale in the shop. The second is that he must see that the experts receive the meat and examine it in the same condition as it was in the shop. The third is that he must select the best experts reasonably open to him to select. The fourth is that he must not influence the experts by *ex parte* information. They must be left to make their own examination. And the fifth is that, having selected experts, he is in reason bound to give the jury the result arrived at by these experts and not by a selection of them, the ones that suit himself. Now, gentlemen, you will have to consider whether these five conditions have, or have not, been fulfilled here. In the first place is it clear—has it been proved, not morally but legally—has it been proved that the meat submitted to Dr. Whiteford, Principal Dewar, Mr. M'Luskie, and Mr. Miller was the same meat. Observe the difference. The meat submitted to Dr. Whiteford was undoubtedly the same meat. Mr. Pottie, the defender, acted quite properly there. He took Dr. Whiteford to the shop, and Dr. Whiteford saw the meat bought, and there can be no doubt about that meat. Observe the difference in the other cases, and it is for you to consider this matter, not for me, but you know the facts. I should have thought, gentlemen, that the proper way to have gone about it would have been in Mr. Gordon's presence, he knowing perfectly well, as we know he did, what was the defender's position at the time. He would have got meat from Mr. Gordon, and would then have had it put into proper paper and would then have had it sealed. That is what is alleged to have happened in the case when, you remember, M'Phee and the defender's wife are said to have seen certain parcels opened and examined and again sealed. I suppose that in the original pleadings, looking to the word "again," there must have been a previous statement that they were originally sealed, which has disappeared, but at all events there you have, I think, an excellent illustration of the method that ought to be followed in every case where a serious accusation is made. Why should the defender have left it entirely to his own evidence, the vital question of whether or not Principal Dewar, M'Luskie, and Miller examined the meat that has been exposed. There was the simplest way open to him to have put that beyond discussion. He says that he took Mackay and took Bennett and consulted Dr. Cook how he was to get parcels of meat, and he took Bennett and Mackay to the shop so that they might see him purchase the meat. What earthly use was that? If they had seen him purchase the meat and seal it up, as is always said, and if Principal Dewar had said what he did on finding the seal unbroken, that would have been an end to the question. But you will consider, gentlemen, whether it was fair for the defender to risk this vital point on his own interested testimony, for that is how it stands. It is all very well for Mr. Watt to say that he would not make charges, and he is sure Mr. Wilson, his learned friend, would not make charges either. There must be charges here made on the one side or the other, because you will consider whether it is possible to reconcile the evidence of Principal Dewar and Mr. M'Luskie and Mr. Miller, perfectly honestly given, with the real evidence that we have in the case. You will consider whether, accepting their statement that it was stuff that nobody would buy, or if they unwittingly bought it nobody would take home, they can have examined the same material as was in point of fact sold—we don't know to how many—but if there were 140lbs., and if it went off in quarter pounds, in pounds and two pounds, I suppose you might say an average would be one pound. That would be one hundred purchasers. You will consider whether the defender was entitled to peril that which is at the bottom of the whole case on his unsupported evidence, because of course Mackay seeing him buy the stuff comes to nothing, because it was merely wrapped in paper, and there is no following of it out and tracing it into Dr. Dewar's hands.

That is the first point. Dr. Whiteford stands in a different position, and I shall refer to him immediately. There is no doubt whatever that he got meat purchased from the shop. Then what about the meat being in the same condition when the experts examined it. I should have thought that on the Saturday night, having bought meat and having sealed it up, the defender would then and there have posted it to Principal Dewar. There is no question about Principal Dewar, the very best man that could have been got. Principal Dewar said two things. He said, in the first place—I certainly should have liked to have seen the carcase: and he said, in the second place—I detected, mingled with a disagreeable odour, the smell of decomposition. Mr. Watt is very eloquent on nobody saying there was any sign of decomposition. His leading witness, Principal Dewar, said that he smelt distinctly along with the other odour, the smell of decomposition. That is the second point, gentlemen.

The third point is the selection of the best experts, and it comes to this. Of Principal Dewar undoubtedly there is not a word to be said except in his favour. Why he was not employed at once I don't know. But as to Mr. M'Luskie and Mr. Miller, you will form your own impression of them, always taking them as perfectly honest witnesses, but you will consider them in relation to the corresponding witnesses, some of them no better, some of them no worse, for the pursuer; and you will say whether their opinion would be sufficient on important matters, especially that extraordinary matter of the extravasation of blood. I would have liked to have heard Principal Dewar on this remarkable theory of extravasated blood, the capillaries pouring out the blood into the vessels. He gave us no indication of that. I looked up the book which has been so often quoted, but could find nothing about it. One can understand extravasated blood if there is an injury. One can understand it if there is apoplexy and a vessel bursts in the brain. But I would certainly have liked to have heard the views of Principal Dewar on what seems to be the foundation of Messrs. M'Luskie's and Miller's views as to the evil condition of this blood. As to Dr. Whiteford, gentlemen, Mr. Watt again was very eloquent. What could Mr. Pottie do? One man in the town had the degree of D.P.H. Dr. Cook had the degree of D.P.H. Nobody suggests that he is in any way mixed up with the parties. Dr. Cook had also the degree of Bachelor of Science, which Dr. Whiteford had not, but I am afraid, gentlemen, that there is a very fatal observation on Dr. Whiteford, namely, that he did not apply the knife. Now, the defender's experts are all agreed that without applying the knife, you can come to no conclusion whatever. You may be quite wrong; the outside may lead you to too favourable a view or too unfavourable. You cut open so as to reveal fresh tissues, and Dr. Whiteford did not.

Then, next, in regard to not influencing the experts. Dr. Whiteford gave a curious piece of evidence there. Dr. Whiteford said that Mr. Pottie told him that he had heard that the cow had died. Well, that is a very curious part of the case, because Mr. Pottie had been told by Mr. McKellar, the deceased killer, that the cow had been killed; and it is a curious thing that he should have, after being told by the man who killed the beast, told the expert that he had heard that the cow had died.

And lastly, gentlemen, on the question of the right of the defender to have a lot of people examining the carcase and then to select those that suited him, he has given us McLuskie, Miller, and Dewar. He has not given us McDougall the veterinary surgeon of Dumbarton, to whom he sent on Tuesday the 18th, nor Dr. Stewart in Gourock, nor Mr. Thomson in Edinburgh, nor Mr. Tully in Kelso; but he has given us witnesses perfectly responsible, and, in the case of Principal Dewar, of the highest eminence; and you will consider their evidence and form your own opinion on it.

Now, gentlemen, these being the antecedent conditions for your consideration—for I am not judging the case, it is you who have got to judge it—but if you think that these conditions were reasonably fulfilled, then you will go on to consider the evidence. Of course on this question manifestly the defender has a difficult but not an impossible task. He has a difficult task, because it is proved in this case to start with that the system in Greenock is not a slack system. The complaint by the witnesses is that it is an over-strict system, that carcases are condemned which should not be condemned, and if Mr. M'Intyre is alleged to have a fault, it is that he is spoiling the business of the butchers by rendering it unprofitable and depriving them of using carcases which they might fairly use. That is the start of the case, and not a very favourable start for the defender's view. Then, next, you have got the fact that it was passed in the slaughter-house by an undoubtedly competent man, although youthful—Mr. M'Intyre. You have got the fact that Mr. Howard says that he would have done the same—the assistant in the slaughter-house—and that, for what it is worth, the cleaner saw nothing wrong with it. M'Intyre's competency is not impugned, but a reason is suggested why he passed the meat. That was the statement of Mr. Gordon, you remember, to the defender that he had induced M'Intyre—whether by a dram or otherwise it was not said—but for some occult reason he had induced M'Intyre, who was going to condemn the whole carcase, to hand it over to him. He had prigged the carcase from M'Intyre who was going to sink it. Well, gentlemen, you will consider the probability of that statement, and, if you think it fairly probable, whether it has been proved; but that is the position in which the case starts, taken along with this, that of course not only have you M'Intyre passing the carcase—the competent authority—but you have got the other authority in the place, Dr. Cook, the Medical Officer of Health. He says—I saw the meat undoubtedly, for I went over the whole shop and examined the entire place, back and front, and I found no unsound meat there. Now, gentlemen, these men may be all wrong. I said the defender's case was a difficult one, but not an impossible one. You may think that these were all wrong, that M'Intyre was wheedled into handing over the carcase to Gordon. Why Dr. Cook should have done wrong I don't know. No suggestion has been made why his judgment was mystified, why it was that this man with so many degrees and apparently in his sound senses passed his hand over food-stuff to which your hands stuck, stuff that was of a colour which showed at once that it was unfit, stuff that smelt so that anybody would be able to feel that it had a disagreeable odour, But I say again, these men may be all wrong, and it is entirely for you to say whether, in the face of all that evidence, the defender has proved to your satisfaction that the meat was unfit and unsound. Now, gentlemen, I am not going into the evidence. You have heard the witnesses on the one side and on the other—Trotter, and the whole lot of them. You have heard the butchers, and amongst the butchers you have heard of a piece of evidence which, if you believe it, gentlemen, is a very startling one. You saw M'Phail, and you would form your own opinion as to whether he is truthful or the reverse, but he told you that he wanted the carcase—this carcase that nobody would buy and nobody would take home—and he found that Gordon had prigged it, to use that expression, from M'Intyre, because he had the first chance of it, and he had got it. Now, gentlemen, M'Phail is evidently a man of experience, and it is all very well to say that butchers will do anything. They won't buy what they cannot sell. They will buy what people will buy from them, but if his meat was such as Principal Dewar says, that no one would buy it or take it home, butchers, unless in Morningside, won't be found to go in for that kind of undertaking; and you will form your own opinion of whether that is a valuable fact or not. You saw M'Phail and you will judge for yourselves.

Then, gentlemen, you will also consider the importance—it is not conclusive in the least, as Principal Dewar told us—the importance of the fact that these 140 lbs. were sold in small parcels, and nobody has been found to complain of the quality of the meat. Now, I don't know that the poor are in any way different from the rich in the way of their tendency to complain. I rather imagine that butchers and all tradesmen are very familiar with this, that if there is anything wrong somebody will find it out and somebody will want their money back, and nobody has come forward, even after this disturbance and hubbub, to say I got stuff that was

bad and I want my money back. Out of the whole people, who must be a very large crowd, for if you have anything like 100 purchasers that would mean a large number of people who consumed the food, nobody has been found to complain. As Principal Dewar said, that is not conclusive. As Mr. Watt quite properly said, the very purpose of inspection is to prevent risk, and it is perfectly possible that meat which is unsound may go out and may be consumed without any bad results—one would scarcely expect without any complaints. But, as you have heard, here neither were there bad results nor were there complaints. Now, gentlemen, this of course, as I have said, is not a case of latent defect. It is a case of patent defect, something that everybody could see, and that makes it impossible, as I have already observed, to reconcile the evidence. You must say on which side the truth lies. I cannot assist you further, gentlemen, on that matter, except by making this observation. We would all like to have reconciled the evidence. We would all liked to have said—well, the pursuer's witnesses must have seen the good stuff, and the defender's witnesses must have got the bad stuff, and then we would have had no question about people telling the truth. You cannot say that, because Dr. Cook saw it too. Dr. Cook went over the entire shop, and he saw what the defenders afterwards got, and he saw what the pursuers spoke to, so that I am sorry to say it is absolutely necessary for you to consider the question, I am afraid from the point of view that you must make up your mind between the one set of witnesses and the other. Now, gentlemen, suppose you think that the defender has proved beyond reasonable doubt that the meat was unsound and unfit, that is an end of the case. You will find for the defender.

If you think he has not proved that, the next question is—and it is a question on which I have got to direct you—were the statements, all or any of them, made by the defender to the different persons named in the Issues privileged. Now, gentlemen, that is a matter, as I said, for me, but I am sure you will see that it is a legal question founded on common sense. There are relations in life which the law desires to protect, in which the law wishes to encourage statements to be made, statements to be made at once, statements to be made before there is any possibility of enquiry, and merely because the statement turns out to be untrue that won't in the least affect the right of the person to say—I was entitled to make it, and although it is untrue you cannot claim damages from me. The person so occupying that position is held to be privileged, and I am going to make a distinction in the case between the position of Devine and Dr. Cook, on the one hand, and the position of Mackay, Angus and Smith, on the other. As you have heard in the legal argument, the two questions of privilege and of malice have been a good deal mixed up. They have been mixed up in the legal opinions that have been quoted to you. They are mixed up in the books of authority on this subject, but I am going to direct you that privilege being the protection afforded by law to a person who has apparent occasion in the discharge of a duty or the exercise of a right to speak or act to the injury of another person, or, to put it in rather different language, privilege being a statement which is made by a person apparently in the discharge of some public or private duty in matters where his interest is concerned to another person having a corresponding duty or interest, the defender did occupy that position in relation to the two persons who were directly entrusted with the question of unsound meat. I am going to hold that those persons were Mr. Devine and Dr. Cook, and I am going to hold that the Chief Constable Angus, the Police Constable Mackay, and Mr. Smith, although having a remote relation to the management of the meat business, had not such relation to it as would entitle the defender to claim that statements made to them gave him the advantage of speaking with privilege. And therefore, gentlemen, the result of that is this, that you will kindly, into the first two Issues which you have got before you, insert a word. You see the first Issue runs, "The defender falsely and calumniously." Will you be good enough to add in the margin "and maliciously." Then in the second Issue you see in the second line "falsely and calumniously." Just add "and maliciously." Then you don't touch the other Issues, because in the case of the other Issues you won't have to consider the question that I am now going to, the question of malice.

In connection with the Issue No. 3, to take that as an illustration, you of course start with this, that the words were said. If you hold that the defender has not proved that these words were true, then you will find for the pursuer. But in the case of Issues 1 and 2, even if you hold that the words were not true, still I direct you that the defender was privileged in making these statements, and that being so, it is necessary for the pursuer to show that he did not make them honestly, that he made them for an ulterior and illegitimate object, that he had no reasonable grounds for making them, and that you are satisfied in your mind that he made them in the way that the law defines as "maliciously." Now, gentlemen, that is the only other question, except damages, that I have to address you on, and it is confined now to Issues 1 and 2. I have nothing further to do with Issues 3, 4, 5 and 7. Mr. Wilson has treated this matter of malice in a very different way from Mr. Watt. Mr. Wilson has treated it seriously, and Mr. Watt has treated it rather lightly. Mr. Watt has said—Why, the men are still not at daggers drawn; there is no evidence that Mr. Pottie had any reason for entertaining any ill-feeling against Mr. M'Intyre; there is no reason for thinking he had any ill-feeling against the pursuer. Well, gentlemen, that is not conclusive. Mr. Watt had a great deal to say for that, and, as he always does, said it well; Mr. Pottie did not lose the situation by M'Intyre excluding him; M'Intyre accepted the situation on conditions which Mr. Pottie would not agree to. If Mr. Pottie had chosen to agree to these conditions, he would have been to-day in Mr. M'Intyre's place. That is perfectly true—and an observation you will keep in view, because it is a weighty one—but then gentlemen, the law says this, it is not possible to ascertain and it is not necessary to prove people's wishes. Even although we could get at them, they might seem to be so unreasonable that we could not really think they could conceivably be the motive. The law says a man may so act that you will infer—because you can come to no other conclusion—that he was proceeding maliciously, and that is the line that Mr. Wilson took, and you will judge whether his argument was sound or not. You will judge, for instance, by the narrative that we have had of what the defender did, a ratepayer with a perfectly legitimate interest, a duty, to see that bad meat was not sold in the town. It is a most important thing that if bad meat is found exposed for sale it should be stopped. He has also a certain remote interest in connection with his other appointments in Gourock and the outlying part of Renfrewshire, but it is quite sufficient that he was a ratepayer. You will judge, gentlemen, whether that interest seems to you to account for the proceedings that he adopted. If it does, then there is no malice in it. If you say it is not possible that that interest merely can explain the proceedings taken, then by a process of exclusion you will be forced to the conclusion that his acting was malicious. Well, you have heard the remarkable proceedings on that Saturday. At 8.30 telephoned to Devine: 9.30, first visit to Gordon's; a little later, the visit to the pursuer in his house, at 11; 2.30, second visit to Gordon's; 3, telephoned to Dr. Cook; 4, third visit to Gordon's; 5, fourth visit to Gordon's;

5.30, fifth visit to Gordon's; 6, sent Lawrence Martin to buy stuff in the shop, he waiting outside; 6.30, telephoned to Dr. Cook who suggested a visit to the Chief Constable; 6.45 sixth visit to Gordon's with Bailie Bennett and Mackay when two half pounds were bought. You will say what is the impression conveyed on your mind by that as the action of a ratepayer who is only anxious to do his duty in the question of the sale of unsound meat. Then of course you have got the fact to consider that the person to apply to was Mr. Devine. He did apply to Mr. Devine, and if he had merely told Devine that he heard there was unsound meat there, I think he would have done nothing but his duty and done a very creditable act. But you will remember that it is now admitted that he made a positive statement to Devine before he had seen the meat himself. He still sticks to it that he did not do so, but that has been abandoned, and you will consider what effect is produced on your mind as to the matter of motive by a man who makes a positive statement when he has only heard a rumour. Then, having communicated with Devine, a person whose capacity and whose diligence and zeal nobody has impugned, you will judge of what impression is conveyed to your mind by his not being content with that and by his subsequent proceedings on to the communication with Dr. Cook. Then, Dr. Cook being communicated with, you will judge of what impression is conveyed to your mind on hearing from Dr. Cook, or rather from the policeman, Dr. Cook's view that there was nothing wrong with the meat—whether that in the ordinary case would not have satisfied even the most zealous ratepayer as against any rumours or against his own impression about the meat. It is for you to say what view you derive from the proceedings of that day. The proceedings in sending so many samples I don't think comes to very much, except in the view that I have already brought before you as to the way they were sent and the time they were sent, but you will judge as to all that matter in the light of the evidence that you have heard and the speeches to which you have listened. Of course, gentlemen, if you think that the statement made by the defender as to what M'Phail said to him, and as corroborated by Ponsonby, is not true, then that may be very serious on this question of malice, for of course the defender's case is—I was told about it by M'Phail. M'Phail, corroborated by Ponsonby, says—I never told him anything of the sort. The mere difference of the date is not so vital, although it cannot be thrown out of view that they place the interview on different days, but that is the defender's case. McPhail, he says, was the origin of the whole business. If McPhail was not the origin, then we have not got to the bottom of it. We have not got to how the defender knew about this beast at all. McPhail and Ponsonby say it is not the case that they were the people that gave him information; "it was he who gave information to us"; and you have heard the witnesses, and will judge of the effect on your mind of the conduct on that occasion, along with the other matter, which I think was the one—the other matter that Mr. Wilson referred to—the conduct of the defender in taking the policeman in uniform and the Bailie to the shop that night. Now, Mr. Watt was very ingenious in that. Mr. Watt thinks that instead of the pursuer bringing an action against the defender, he should have looked upon him as a philanthropist and as a man who was studying the pursuer's interests throughout. Well, you will judge, gentlemen, whether, at a crowded time of the busy day of the week, merely waiting until some people went out, was or was not a reckless interference with the pursuer's rights—to take a policeman and a well-known Bailie of the Burgh into the shop, not into the back shop, but into the shop, and to collect a crowd and to cause the hubbub that we have heard deponed to, and not denied by the witnesses in this case. It would have been useless to deny it, because it is a thing that is sure to happen. You cannot stand on the street and look up into the clouds without getting a big crowd at once, and it is quite certain that the position of matters that night collected a large number of people That is an element for you to consider. In your view, what was the defender's real intention and meaning that night?

Now, gentlemen, there is only the other matter of damages. Mr. Watt endeavoured to minimise that, and legitimately to a certain extent, but I don't think that he was quite right in his view that Mr. Wilson merely asked vindication of character. Mr. Wilson admitted that you could not take the £116 of diminution in the profits—apparent diminution in the profits—for two reasons, because (first) the winter months and early spring are much the best, and (second) because the trade is bad all round; but you will remember, gentlemen, that in the subsequent days in February and in March, which nobody says is a bad month, it is still one of the good months—you will remember that there was undoubtedly a remarkable drop, and I merely recall it to your recollection—it is the last observation I have to make to you, as contained in the evidence of Mr. Rowan. Now, with regard to the days before, which were a month after the conviction, a conviction reported in the papers would tell at once. The conviction must have told immediately after it took place and was reported. A man outlives a conviction of that kind, which did not involve any serious offence, although the law has quite properly said—You shan't sell immature animals and you shan't kill animals in your back shop — but that would tell immediately. The business would tend to revive and not to decrease after the immediate effects of it had passed off. You find that the takings prior to this particular occasion were roughly about £30 a week. Then you find that drops to £18, £20, £19, £19, £20, £17, £15, £18, and so on, without going down beyond the month of March, so that I take it that while this is not a case for anything like extravagant damages, it is clearly a case, if you think that the defender has not succeeded in proving the truth of his statements, or if you think that in regard to the two privileged cases the pursuer has succeeded in proving malice, then gentlemen, I think you must agree that it is a case for substantial damages, keeping in view that you are simply to endeavour to make up to the pursuer for what you think he may fairly have lost; and the observation was quite sound which was made, that you cannot expect all the people who left to be trotted out here. This is a casual custom, passers-by, not regular clients who can be produced in the box and who can say—We terminated a life-long connection with this shop on account of these statements, but the passer-by who comes to know that there is a shop in Greenock which has had a very bad report, and which they had better avoid. There are lots of other fleshers eager for custom, and you heard the statement of the nephew that people came to him and said—Well, we will come here, you sell much better meat than your uncle, we have nothing against you. On the question of damages, if you reach it, you will do, I have no doubt, justice between the parties. Now, gentlemen, these are the questions, and you will consider your verdict, If you are unanimous, then you can come back at any time. If you are not, then I have to make the usual disagreeable announcement that you will require to be shut up for three hours.

COMMUNICATIONS AND PAPERS RECEIVED.—Messrs. F. B. Eve, J. R. Baxter, F. O. Parsons, J. B. Robertson, W. Awde, J. H. Parker. "Mrs. Malaprop."

Royal Dick College Magazine: December.

The Dudley Herald, *The Liverpool Daily Post*, *The Daily Telegraph*, *The Greenock Telegraph*. Dec. 12.

Personal.

Mr. H. Tudor Hughes, M.R.C.V.S., son of Mr. R. Hughes, F.R.C.V.S., Oswestry, Salop, was awarded the Degree of Bachelor of Science, at the final examination held between November 5th and 14th, of University of London, Faculty of Science.

ARMY VETERINARY SERVICE.

Extract from *London Gazette*,

War Office, Whitehall, Dec. 15.

Territorial Force. Unattached List.

Vet.-Lieut. Robert Norman Lewis, from the Highland Royal Garrison Artillery (Vols.), to be Vet.-Lieut. with precedence as in Volunteer Force. Dated April 1, 1908.

OBITUARY.

J. Sully, V.S., Roadwater, Taunton.

A little after midday on Wednesday, 9th inst., Mr. John Sully, veterinary surgeon, was driving from Roadwater in the direction of Hungerford, and met on the way Mr. D. W. Bishop, of Higher Court Farm, who was driving a flock of sheep. After proceeding some distance in conversation with Mr. Bishop, Mr. Sully drove on to get in front of the sheep, and then for some reason —probably one of the sheep touched it—his horse bolted. Immediately in front was Mr. T. Smith, M.R.C.V.S., of Williton, who had ridden past the sheep just before, and on his hearing a shout he turned round and saw that Mr. Sully's cob had bolted. Mr. Smith put spurs to his horse and succeeded in keeping in front of the runaway, which safely negotiated the narrow bit of road between the White Horse and Hungerford farm, although here it met a waggon coming in the opposite direction, but on getting into the road leading to Washford, Mr. Sully was thrown out of his trap on the riverside of the road just at the commencement of the guard wall. The horse continued down the road, and followed Mr. Smith to the Washford railway station, where he checked his horse, and then saw that Mr. Sully was not in the trap. The runaway turned in through the station gates, and was stopped on the line. Mr. Smith went back to see what had befallen Mr. Sully, and found him at Hungerford. Messengers were sent to Roadwater to apprise the family of the accident, and also for medical assistance and the district nurse. Fortunately Dr. S. Graham came along in his motor-car a few minutes after the accident, and the nurse was soon in attendance, and Mr. Sully's injuries were attended to. He was found to be suffering from an extensive cut over the left eyebrow, causing a compound comminuted fracture, and exposing the brain, while his face was badly disfigured. Both bones of the left forearm were smashed, and internal injuries were feared. Efforts were made to get a conveyance to take the injured man back to Roadwater, and eventually one of Mr. Babbage's waggons was requisitioned, and Mr. Sully was conveyed home, where Dr. F. G. Hayes, of Dunster, saw him in the course of the day. A later inspection of the horse's harness revealed that the bit was broken, and probably this happened just at the turn leading into the Washford Road, and was the cause of Mr. Sully being precipitated into the road, his head probably coming into contact with the wall or the post of the adjoining iron fence. From the first there was practically no hope of recovery, and, though he regained consciousness, Mr. Sully succumbed to his injuries at about four o'clock on Thursday afternoon.—*West Somerset Free Press.*

Mr. Sully leaves a widow and a family of eight children.

DISEASES OF ANIMALS ACTS 1894 TO 1903. SUMMARY OF RETURNS.

Period.	Anthrax.		Foot-and-Mouth Disease.		Glanders (including Farcy)		Rabies. Cases Confirmed.		Sheep Scab.	Swine Fever.	
	Out-breaks	Ani-mals.	Out-breaks	Ani-mals.	Out-breaks	Ani-mals.	Dogs.	Other	Out-breaks	Out-breaks.	Slaughtered *
Gt. BRITAIN. Week ended Dec. 12	23	26			14	40			25	49	386
Corresponding week in 1907 ..	27	32			16	26			63	32	136
Corresponding week in 1906 ..	20	28			12	15			30	52	230
Corresponding week in 1905 ..	24	39			22	38			30	22	166
Total for 50 weeks, 1908	1062	1368	3	112	766	2372			780	2014	13304
Corresponding period in 1907 ..	1036	1404			826	1854			647	2282	10320
Corresponding period in 1906 ..	891	1259			1045	1967			477	1215	6507
Corresponding period in 1905 ..	934	1273			1168	1999			856	787	3684

Board of Agriculture and Fisheries, Dec. 15, 1908.

IRELAND. Week ended Dec. 5	..	..	..	..	..	..	..	..	10	1	12
Corresponding Week in 1907 ..	..	..	..	..	1	1	..	..	15	2	3
Corresponding Week in 1906 ..	..	..	..	..	..	..	..	..	7	1	72
Corresponding Week in 1905 ..	..	..	..	..	..	..	..	..	17	..	..
Total for 49 weeks, 1908	7	10	..	..	..	..	..	..	343	156	3575
Corresponding period in 1907 ..	3	5	..	..	6	11	..	..	255	146	2635
Corresponding period in 1906 ..	4	8	..	..	8	16	..	..	228	92	1055
Corresponding period in 1905 ..	3	5	..	..	29	100	..	..	301	137	1415

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Dec. 9, 1908

Note.—The figures for the Current Year are approximate only.

* As Diseased or Exposed to Infection